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H. H. Root, Assistant Editor
H. G. Rowe, M'n'g Editor

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These prices are F. O. B. Glendale, Ohio. All prices subject to change without notice.

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HONEY MARKETS

U. S. GOVERNMENT MARKET REPORTS. Information from Producing Areas (first half of January).

CALIFORNIA POINTS.—Southern California: Moderate rains have fallen in San Diego County, but in other counties rainfall has been light, and much below normal. Weather generally cold, lessening activities of the bees. When flying they have secured some feed from lemons, cover crops, etc. Many beekeepers selling out. It is generally predicted that 25 to 50 per cent of bees will starve before spring honey flow. Few sales reported of orange extracted at 14-15c per lb. in 60-lb. cans and amber extracted at 8¼-10c per lb. Beeswax has ranged 20-25c per lb. to the beekeeper. Northern California: Rainfall very light to date. Unusually cold weather being experienced. Few sales reported of honey. Beeswax reported sold at 24c per lb. cash or 25c in trade.

PACIFIC NORTHWEST.—Demand for honey continues rather slow. Since Christmas it has been generally too cold for flights. White extracted quoted in carlots, 10-11c, ton lots, 11-11½c, single 60s, 12½c, and in small pails, wholesale lots, 14-17c per lb. Sales of beeswax reported at a range of 23-30c per lb.

INTERMOUNTAIN REGION.—Very severe cold weather, with little snow on the ground. Some sections report the coldest weather in over 10 years. In some districts it is not expected that bees will winter as well as had been anticipated as cold weather has caused rapid consumption of stores, much of them of poor quality, necessitating flights, which are impossible at present. Extracted demand slow during past two weeks, with few inquiries or sales. Few carlots white sweet clover and alfalfa extracted reported sold at 9¼-9½c per lb., ton lots 9-10c, single 60s, 9½-13c, mostly 11-12c; small pails, 12½-17c per lb. Carlots of extracted seem to be generally held for 9c per lb. for light amber, and 10c, few 9½c, for white. Comb honey is scarce. One carlot reported sold at $4.50 per case for fancy white; $4.25 for No. 1 light amber, and $4.00 for choice amber. Small lot sales at $4.75-5.00 per case. Beeswax has sold at 22-24c per lb. cash, or 25c in trade. Considerable interest reported in the use of the 50-50 mixture of honey and water in automobile radiators. Where properly boiled and stirred, and with correct specific gravity, the mixture is said to have been successful at below zero temperatures.

ARIZONA POINTS.—Plenty of rain, and with other conditions favorable, present indications are for a fine crop in 1924. Rains have helped the desert plants. Considerable alfalfa plowed up for cotton. Practically all honey now out of beekeepers' hands. Some beeswax sold at 25c per lb. Few sales amber extracted in 60-lb. cans at 10c per lb.

TEXAS POINTS.—Continued rains during November and December have made prospects good for 1924, although in upper part of the state recent freezes have set back honey flow and brood-rearing. Further south in the state brood-rearing has begun and pollen is coming in freely from ground nettle and wild currant. Horsemint and hoarhound plants are coming up in good shape and outlook is very promising. Very few sales reported.

PLAINS AREA—Extreme cold weather since the first of the year broke 12-year temperature records and was very hard on outside-wintered bees. Much clover was protected by snow. In some sections mild weather during past few days has permitted flights. Honey is getting well cleaned up. Few sales white clover in 60-lb. cans at 15c per lb., ton lots 10c, small pails, wholesale 12½-18c, mostly around 15-16c per lb. Beeswax has sold at 25c per lb.

EAST CENTRAL AND NORTH CENTRAL STATES.—Clover in good shape, with covering of snow, following abundant rains. Recent cold wave hard on outside-wintered bees. Little honey has been sold recently, but market is steady. Small lots are well cleaned up and large lots are working off gradually. One carlot white clover extracted reported sold at 8½c per lb., another at 10½c, ton lots 9-12c, single 60s, 10-15½, and small pails, wholesale, 16-20c per lb. Amber extracted, 9-10c, baking stock, 7c per lb. Few sales No. 1 white comb at $4.50-5.50 per case. Beeswax has sold at 25-28c per lb. in trade, or 22-25c per lb. cash.

NORTHEASTERN STATES.—Some sections have experienced severe cold weather, but generally bees have been flying nearly every week. Little snow on ground as protection to clover. Bees wintering well, both outdoors and in cellars. Comb honey is now scarce, and extracted is cleaning up gradually. One car white clover extracted reported sold at 10⅝c per lb.; ton lots and single 60s white clover, 10-12½c. Buckwheat, 7-10c per lb. Few sales white clover comb at $4.00-4.80 per case.

SOUTHEASTERN STATES.—Recent severe cold spell has killed some young clover, confined bees to the hives, and retarded brood-rearing. Some colonies have begun to breed up, bringing in pollen and a little nectar from maples and pennyroyal on warm days. Where stores were ample, bees are expected to have a light winter loss. Demand for package bees better than for several seasons past. Little honey left. Few sales reported light amber extracted single 60-lb. cans 12-15c, barrels, 8-10c, amber in barrel 6-8c. Beeswax has sold at 25c per lb.

Telegraphic Reports from Important Markets.

CHICAGO.—Since last report 1 car Louisiana, 5,330 lbs. Wisconsin arrived. Movement slow, market about steady with prices slightly lower than last report. Extracted: Sales to bottlers and confectioners, per lb., Wisconsin white clover and basswood, 12-13c; Iowa, Wisconsin and Illinois, white clover and alfalfa, 11-11½; light amber, 10-10½c; dark amber, 8½-9½c. Comb: Sales to retailers, Colorado, Illinois, Wisconsin and Iowa, 24-section cases fancy white, $4.75-5.00; choice, $4.00-4.50; dark, off color, $2.50-3.00. Illinois, fancy double-deck cases, mostly, $5.00. Beeswax: Movement slow, market steady, little change in prices. Wisconsin and Illinois, bright, pure, 29-30c; medium dark, 25-27c; dirty, dark, 20-22c.

NEW YORK.—Extracted: Since last report 256 bbls. Porto Rico, 3 bbls. Haiti, 5 bbls. San Domingo, 10 cases Greece arrived. Domestic receipts liberal. Demand good, market steady. Sales to jobbers, wholesalers, confectioners, bakers and bottlers, per lb., New York, white clover 11½-12½c; buckwheat, 10-10½c. Intermountain, white sweet clover, 11½-12c. California, white orange, 15-16c; light amber sage, 12c. Porto Rico, demand moderate, market dull, 82-84c per gal. Beeswax: Since last report 37 bags Chile, 39 bags Cuba, 17 bags 5 seroons Porto Rico, 5 seroons San Domingo, 75 cases bleached from Holland arrived. Demand moderate, market steady. Chile, light, 27½-28½c. West Indies and Brazil, light, 28-29c. Italy, light, 25½-26c. Africa, dark, 21-22c. West Indies, dark, 21½-22½c lb.

ST. LOUIS.—No large arrivals since last report. Practically no demand, market very dull. Sales direct to retailers: Comb, Wyoming, 24-section cases, $5.75-6.00. Extracted: Western, light amber alfalfa and white sweet clover, 8-10c per lb. Beeswax: Dealers quoting 24c for country-run wax.

H. C. TAYLOR,
Chief of Bureau of Markets.

The A. I. Root Company's Report.

During the past thirty days we have purchased only one lot of honey—approximately 16,000 pounds of extracted white clover at 9½c per pound f. o. b. shipping point.

Early in January we sent to actual honey producers the following questions:

1. What per cent of the honey produced in your locality is still left in the hands of the producers?
2. What prices are producers now being offered at their stations in large lots (carload or entire crop)? (a) Extracted honey a pound? (b) Comb honey, fancy and No. 1, per case?
3. What are prices when sold to grocers in case lots? (a) Extracted honey in 5-lb. pails or other retail packages in terms of 5-lb. pails? (b) Comb honey, fancy and No. 1, per case?
4. What is the retail price to consumers in your locality? (a) Extracted honey in 5-lb. pails or other retail packages in terms of 5-lb. pails? (b) Comb honey per section?
5. How is honey now moving on the market in your locality? Give answer in one word as slow, fair or rapid.
6. What is the condition of the colonies at this time as compared with normal? Give answer in per cent.
7. What is your estimate of the condition of the honey plants for next season as compared with normal? Give answer in per cent.

The answers, as returned by our bee and honey reporters, are as follows:

State.	Reported by:	Pct. Unsold.	In large lots. Ex.	In large lots. Comb.	In small lots. Ex.	In small lots. Comb.	Retail Prices. Ex.	Retail Prices. Comb.	Movement.	Col. Con.	Plant Con.
Ala.	J. M. Cutts	...	..	...	..	...	..	..	..	60	75
Ark.	J. Johnson	0	..	..	..	...	..	..	..	50	50
Ark.	J. V. Ormond	0	..	...	..	...	..	..	..	100	100
B. C.	W. J. Sheppard	20	$.20	...	$1.25	...	$1.50	..	Fair	100	100
Cal.	L. L. Andrews	0	..	...	.85	...	1.00	.27	Fair	75	50
Cal.	M. H. Mendleson	...	..	...	..	...	1.10	.35	Slow	..	..
Cal.	G. Larinan	10	.12½	...	..	...	1.00	..	Rapid	..	25
Cal.	M. C. Richter	10	..	...	..	...	1.50	..	Fair	100	90
Cal.	M. A. Saylor	5	.11	...	.70	4.80	.90	.25	Fair	90	90
Col.	J. A. Green	30	.09	...	.70	4.80	.85	.25	Fair	100	100
Col.	B. W. Hopper	0	..	...	..	...	.90	.20	Fair	95	100
Conn.	A. Latham	37	..	...	1.00	6.30	1.25	.25	Slow	110	100
Fla.	C. C. Cook	0	.07	...	.80	...	.95	..	Rapid	125	125
Fla.	F. E. Munson	5	..	...	.70	...	.85	..	Fair	100	70
Fla.	H. Hewitt	0	..	...	.75	...	1.00	..	..	90	100
Ga.	J. J. Wilder	3	.10	...	..	4.75	..	..	Fair	100	100
Ida.	J. E. Miller	10	.09⅛	4.50	.55	...	.75	.27	Fair	90	100
Ill.	C. F. Bender	10	..	...	..	6.00	..	.30	Slow	90	60
Ill.	A. L. Kildow	50	..	...	..	...	.75	.25	Slow	100	60
Ind.	T. C. Johnson	0	..	...	.90	6.00	1.10	.32	Slow	100	100
Ind.	E. S. Miller	40	..	...	.80	5.75	1.00	.30	Fair	100	100
Ind.	J. Smith	0	..	...	1.05	...	1.25	.35	Slow	75	150
Ia.	E. G. Brown	75	.10	...	.60	5.00	1.25	.25	Fair	100	110
Ia.	F. Coverdale	1	..	...	.75	...	..	..	Fair	100	100
Ia.	W. S. Pangburn	40	..	...	.75	...	..	..	Fair	100	100
Kan.	C. D. Mize	0	..	...	.80	5.25	1.10	.30	Fair	100	100
Kan.	J. A. Nininger	20	..	...	.75	...	.95	.25	Fair	95	90
Ky.	P. C. Ward	...	..	...	..	...	1.25	..	Slow	90	100
La.	E. C. Davis	5	..	...	1.00	...	1.25	..	Fair	100	100
Md.	S. G. Crocker, Jr.	80	..	...	.75	5.75	1.25	.37	Slow	100	100
Me.	O. B. Griffin	35	..	...	1.00	6.75	1.35	.37	Slow	95	90
Mich.	I. D. Bartlett	15	..	...	.75	5.00	1.00	.30	Slow	85	100
Mich.	L. S. Griggs	10	.10	5.50	.75	6.25	.90	.30	Fair	100	100
Mich.	F. Markham	50	.10	...	.80	...	1.25	..	Slow	100	100
Mich.	E. D. Townsend	10	.12	...	..	...	..	..	Fair	100	100
Mont.	R. A. Bray	40	.09	4.25	.65	4.60	.80	.25	Fair	100	100
Mo.	J. W. Romberger	0	.09	4.50	.75	5.25	.90	.32	Rapid	100	..
Mo.	J. H. Fisbeck	33	..	...	1.00	...	1.25	..	Slow	100	100
Nev.	T. V. Damon	0	.09	4.00	.75	5.00	1.00	.25	Fair	100	100
Nev.	G. G. Schmeis	0	..	...	..	5.10	.85	.30	Fair	100	75
N. Y.	G. B. Howe	...	.10	4.25	.75	4.50	1.00	.27	Slow	100	90
N. Y.	F. W. Lesser	3	.10½	...	.75	5.40	1.00	.30	Slow	90	80
N. Y.	N. L. Stevens	10	.10	...	.80	...	.90	..	Fair	110	90
N. Y.	Adams & Myers	...	..	...	1.00	6.00	1.25	.30	Fair	100	100
N. Y.	R. B. Willson	20	.10	5.25	.85	5.65	1.00	.25	Fair	120	70
N. C.	C. S. Baumgarner	0	..	...	1.00	...	1.25	.30	Fair	100	100
N. C.	W. J. Martin	10	..	...	1.00	4.50	1.25	..	Fair	90	90
Ohio.	R. D. Hiatt	20	..	...	1.00	6.00	1.40	.35	Slow	90	90
Ohio.	F. Leininger	...	.11	...	1.12	...	..	..	Fair	75	..
Okla.	J. Heueisen	0	..	...	..	...	1.50	.40	Fair	80	90
Ore.	H. A. Scullen	10	..	...	.92	5.50	1.00	.25	Fair	100	100
Ore.	E. J. Ladd	...	..	...	..	5.75	..	.35	Fair	100	100
Pa.	H. Beaver	10	..	...	.75	...	.90	.20	Fair	90	80
Pa.	D. C. Gilham	35	..	...	1.05	7.20	1.40	.40	Fair	70	90
S. C.	A. S. Conradi	0	..	...	..	...	1.25	.35	Slow	100	100
S. D.	L. A. Syverud	15	..	...	..	4.75	.90	.25	Fair	90	100
Tenn.	J. M. Buchanan	0	..	...	..	...	1.25	.35	Slow	90	100
Tex.	J. N. Mayes	0	.15	...	.75	...	.85	..	Rapid	100	100
Tex.	T. A. Bowden	3	..	...	.85	...	1.15	..	Slow	100	100
Tex.	H. B. Parks	0	.11	...	.95	...	..	.25	..	100	110
Vt.	J. E. Crane	25	..	...	1.00	6.40	1.25	.35	Slow	100	100
Va.	T. C. Asher	5	..	...	1.10	6.00	1.25	.30	Fair	95	100
Va.	L. N. Gravely	0	..	...	..	...	1.00	.40	Fair	80	95
Wash.	W. L. Cox	...	..	...	.80	6.75	1.00	.40	Fair	100	100
W.Va.	T. K. Massie	0	..	...	..	...	.90	.32	Fair	75	95
W.Va.	W. C. Griffith	0	..	...	1.30	7.20	1.67	.40	Slow	50	..
Wis.	N. E. France	30	..	...	.80	4.75	1.25	.27	Slow	100	90
Wis.	H. F. Wilson	3	.11½	5.00	.70	6.25	1.05	.35	Slow	100	100
Wyo.	A. D. Brown	50	.08½	...	.65	...	.90	.25	Slow	105	110

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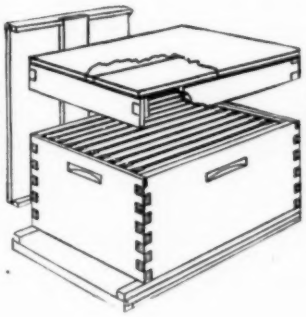

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Metal cover, reversible bottom-board, standard Hoffman self-spacing frames, 10-frame size, per crate of five (5) complete hives,

$15.00

per crate.

STANDARD 10-FRAME HIVE BODIES with Hoffman self-spacing frames. Per crate of 5	$6.75
STANDARD 10-FRAME HIVE BODIES without frames. Per crate of 5	$4.00
JUMBO HIVE BODIES with frames. Per crate of 5	$8.00
COMB SUPERS, No. 1 style, 4¼ x 4¼ x 1⅞-inch, with section-holders, separators. Per crate of 5	$4.50
STANDARD HOFFMAN SELF-SPACING FRAMES. Per 100	$5.00

NOTE—A five (5) lb. package of Medium Brood Foundation free with every $50.00 order received during February.

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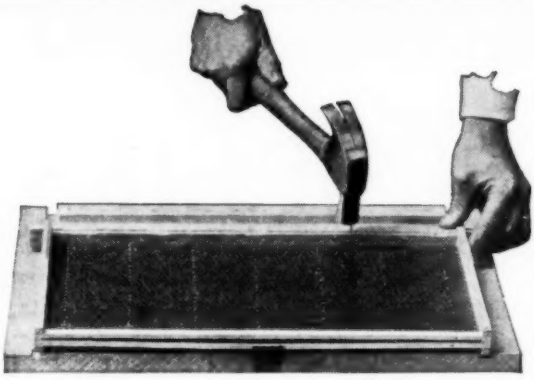

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GLEANINGS IN BEE CULTURE

FEBRUARY, 1924

EDITORIAL

OUR CORNERSTONE

REMEMBER at all times that improved bee culture is our end and aim, and we trust no one will hesitate to give any facts from experience, because they may tend to overthrow any particular person or "hobby." If any of our special plans don't work, or if anything we advertise has had its value overestimated, here in these pages is the place of all others to set the error right.—From A. I. Root's "introductory" in the first issue of Gleanings in Bee Culture, January 1, 1873.

Sterilizing Diseased Combs.

THE Editor of the American Bee Journal, in an answer to a question in its January issue, expresses the opinion that the alcohol-formalin solution should be injected into the combs to be effective. This is not at all necessary, as we have proved again and again during the past year and a half. All that is necessary is to immerse the combs in the solution for 48 hours. The low surface tension of the alcohol insures that the solution will penetrate the cells and completely sterilize the combs without any effort on the part of the operator to fill the cells. In the experiments conducted by Gleanings with this solution, the worst combs of American foul brood to be found (combs filled with scales and most of the cells sealed over) were simply immersed in the solution for 48 hours, after which they were found to be completely sterilized and therefore safe to use again, on being examined in the Bee Culture Laboratory of the Bureau of Entomology, Washington, D. C.

Shall We Produce More Comb Honey?

SINCE the enactment of the Federal Pure Food Law, June 30, 1906, there has been a sweeping change in honey production. Previous to that time most of the honey produced in this country was in the form of comb honey, but now most of it is extracted.

This change from comb honey to extracted honey has, in many respects, been a great blessing to the industry, and at first thought it might seem that it would be better if comb-honey production were entirely discontinued. More honey can be produced in a given area when it is extracted and the combs given back to the bees to be refilled, than when comb honey is produced. It is easier for the beekeeper to control swarming and he can therefore operate a larger number of apiaries for extracted honey than for comb honey. Since extracted honey can be produced cheaper than comb honey the consumer benefits by being able to purchase this wholesome food at a lower price. Extracted honey lends itself to merchandizing much better than does comb honey which, on account of its fragile nature and deterioration from long storage in warehouses, dealers do not like to handle. So far as production and distribution are concerned, the advantages appear to be overwhelmingly in favor of extracted-honey production.

On the other hand, at present wholesale prices more money can be made out a limited number of colonies in a good comb-honey location by producing comb honey than by producing extracted honey. The price per pound for comb honey is now more than double that of extracted honey, while in a location adapted to comb-honey production at least three-fourths as many pounds of comb honey can be produced per colony as of extracted honey. Usually there is a more ready sale for comb honey than extracted honey. Comb-honey production is a challenge to the skill of the beekeeper, which in the case of some producers makes it much more attractive than the production of extracted honey. Comb-honey production is lighter work than extracted-honey production, thus appealing to many who have not sufficient strength to endure the heavy work connected with extracted honey. However, but few if any of these advantages of comb-honey production need be considered by the large commercial honey producer who is already established in extracted-honey production on an extensive scale.

There is one phase of this subject, however, that is often overlooked. Older beekeepers will remember when every corner grocery was supplied with comb honey throughout most of the year. The aggregate amount of honey sold annually

in this way was enormous. If extracted honey had taken the place of the comb honey as the change went on the industry as a whole would be better off from the change, but evidently this is not the case. It is beginning to appear that comb honey and extracted honey are not really competitors on the market and that the disappearance of comb honey from the corner grocery has resulted in an actual loss of potential sales. Not only is this true, but comb honey actually aided the sale of extracted honey. The Editor is becoming more and more convinced that the disappearance of comb honey from a large percentage of the small grocery stores in the country is an actual loss to the industry, and that more extracted honey could be sold if comb honey could be attractively displayed with it.

Perhaps enough commercial comb-honey producers located in regions adapted to comb-honey production will continue producing comb honey in sufficient quantities to supply the fancy groceries in the cities, but if the comb-honey market is not to be lost entirely it would seem that beekeepers located in regions adapted to comb-honey production should produce at least enough comb honey to supply every grocery in their locality, both large and small.

Trend of Honey Prices.

ON the opposite page is a chart showing the trend of prices of white comb and white extracted honey from 1916 up to September, 1923, together with the trend of prices of farm commodities and cane sugar for the same period. The prices in 1913 are taken as a basis, or 100%, which is shown by the heavy straight line. The figures at the left represent per cent of 1913 prices.

The heavy line showing the trend of prices of farm commodities was taken from a chart published by the United States Department of Commerce in the "Survey of Current Business" for October, 1923. The line showing the trend of sugar prices is taken from the annual report of the American Sugar Refining Company for 1922, up to the end of that year, but for 1923 it is made up from the published market prices of granulated sugar during this period. This line showing the trend of honey prices is made up from the government market reports, the prices here charted being an average of the prices given in these reports. In making this chart the prices used were those of the lighter-colored honeys only. This part of the chart was made at this office.

It will be noted that the price of sugar began to rise before the prices of farm commodities but remained almost stationary during a part of 1917, 1918 and 1919, when the price of sugar was controlled by the government. When the government relinquished control, the price of sugar shot upward to its greatest peak in 1920; but, together with other commodities, it broke sharply the latter part of that year. The prices of both comb honey and extracted honey did not begin to rise until about a year after the prices of farm commodities began to climb, and in 1918 when the sugar shortage was most acute the price of extracted honey reached its peak, after which it dropped sharply in 1919. In 1920 the price of extracted honey again rose, apparently in sympathy with the spectacular rise in the price of sugar, but almost immediately started downward with the prices of other commodities. Early in 1922 the price of extracted honey again turned downward at the time the prices of farm commodities were trending upward. Early in 1923 the price of extracted honey reached the pre-war level, then turned slightly upward during the latter half of 1923. On the other hand, the price of comb honey rose gradually from 1917 to 1920 and has remained relatively higher than extracted honey since that time. In other words, comb-honey prices have not been so sensitive to changing conditions. The chart reveals a number of interesting things and will bear a careful study.

It shows that the comb-honey producer now has an advantage of about 30% in price of his product over the producer of extracted honey, taking the 1913 prices as a basis and assuming that prices of comb honey and extracted honey were then in the proper proportion. In 1921 the comb-honey producer had nearly 100% advantage.

While comb honey has enjoyed this advantage since 1920 it has not caused producers to go back to comb-honey production. According to figures put out by the United States Department of Agriculture in December the movement which started back in 1906 from comb-honey production to extracted-honey production is still going on, since the figures show that about 60% of the 1923 honey crop was taken in the extracted form as compared with an average of 51%, while only 30% was taken as comb honey compared with an average of 35%.

The great divergence in the trend of prices of sugar, farm commodities, comb honey and extracted honey during 1923 suggests that in the natural course of events these lines must again move closer together. This affords a ray of hope for the producer of extracted honey, for his product is farther out of line—a

hope that recent quotations on white extracted honey seem to justify. Honey producers' associations should exert every possible effort to prevent ignorant or hard pressed producers from selling below the market.

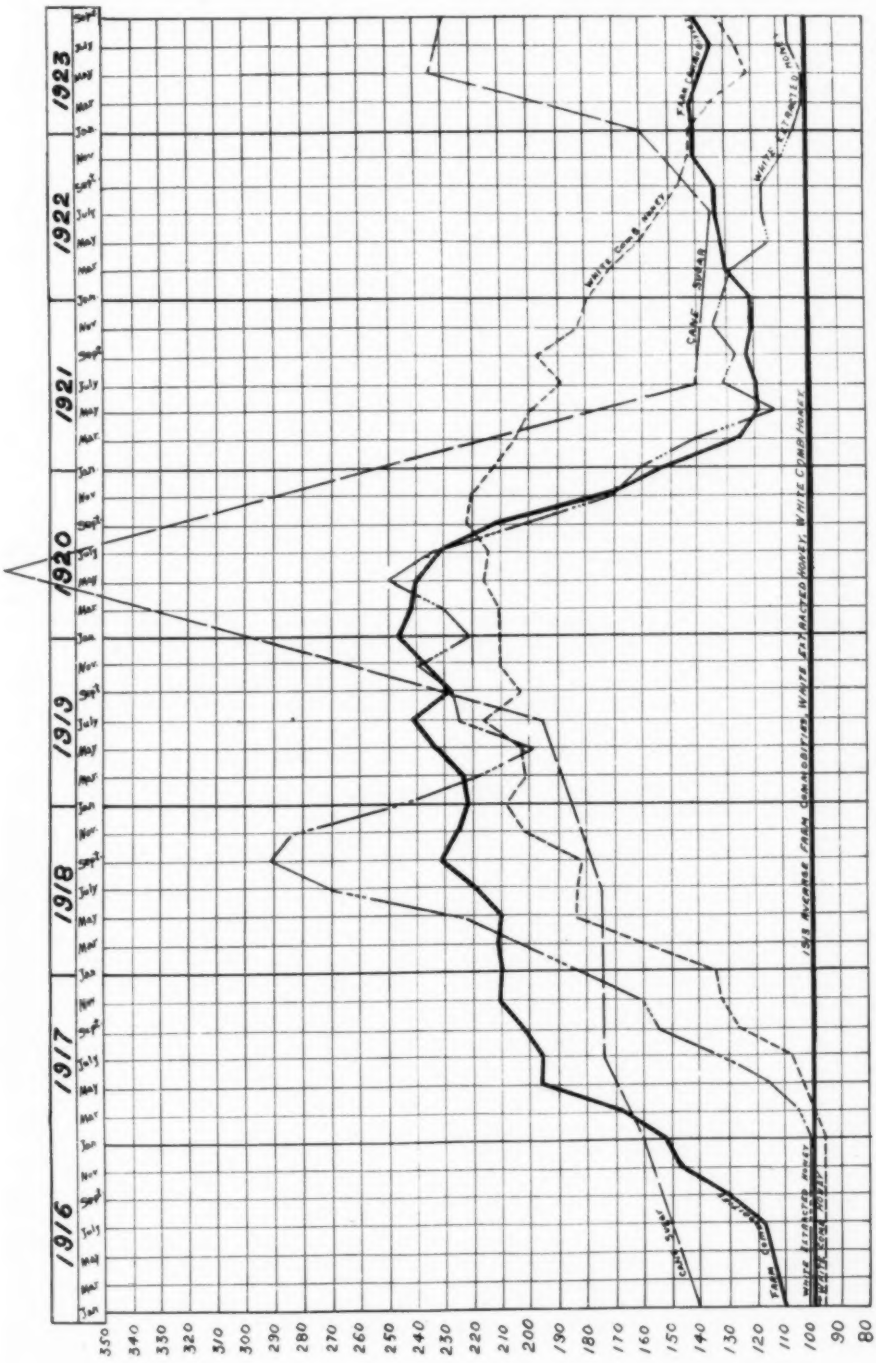


Chart showing trend of prices of cane sugar, farm commodities, white extracted honey and white comb honey from 1916 to September, 1923.

THE DIGESTION OF THE HONEYBEE

By Doctor E. F. Phillips

Tests Reveal Exactly what Kind of Food Bees are Able to Digest

[Read in part at the Wisconsin Beekeepers' Chautauqua in August, 1923.—Editor.]

In several lines of beekeeping practice it is desirable to have definite information regarding the digestion of bees. It is necessary only to mention the great winter losses which result from the condition which we call dysentery to show what great losses may come from a lack of knowledge of this subject. In an effort to clear up some of the doubtful points in this field, a study was recently undertaken of the availability of a considerable number of common carbohydrates as food for bees. The present discussion will, therefore, deal especially with the utilization of the carbohydrates as food and not with the digestion of proteins and fats.

Carbohydrates constitute a large part of the food of man, as well as of that of the lower animals. These substances are also equally important in plant economy; they constitute the energy source for most living things. They may be defined as materials occurring in plants and animals which contain carbon, hydrogen and oxygen in such proportions that on combustion the final products are water and carbon dioxid, with no residue. Common examples of substances of this group are the sugars, starch, dextrins and cellulose, the supporting tissues of most plants. There are many other chemical compounds made up of carbon, hydrogen and oxygen in about the same proportions, among which are the various hydro-carbon oils. Proteins and fat also contain the same constituents, with or without additional materials, but differ in their chemical arrangement. Proteins contain nitrogen in addition to the three elements mentioned, and on combustion form compounds in addition to those mentioned. It is with the utilization of the carbohydrate or sugar group as food for bees that we are now interested, and these constitute the largest and most important part of the food of the adult honeybee, since they are able to live for months on no food other than sugar. Large amounts of pollen containing much protein are used in the feeding of larvae and without this constituent of larval food brood-rearing can not occur.

Different Kinds of Sugar.

All beekeepers know that honey primarily consists of a mixture of three kinds of sugar in solution, these being sucrose or cane sugar, which is normally present only in small quantities, and levulose and dextrose. Levulose and dextrose, which are together often called "invert sugar," are identical in so far as the number of atoms of carbon, hydrogen and oxygen in their composition is concerned, each having six atoms of carbon, twelve of hydrogen and six of oxygen, the chemical formula being written as $C_6H_{12}O_6$. Levulose and dextrose differ greatly in their chemical and physical properties, doubtless because the constituent atoms are arranged differently in the two sugars. There are also several other sugars of the same composition and with somewhat similar atomic arrangement, which because of the number of carbon atoms are known as simple hexose sugars. A well-known sugar of this group is galactose, which is one of the two sugars formed when lactose or milk sugar is split into its component parts. All told there are eight of these simple hexose sugars with a molecular composition comparable to that of dextrose, but with the atoms differently arranged. There are also certain hexose sugars which are arranged somewhat like levulose, which is a somewhat different arrangement from that found in the sugars comparable to dextrose. The plan of the arrangement of the atoms in the molecules of these sugars has been worked out most ingeniously by sugar chemists, so that they know how the atoms are arranged almost as well as if they were able to see the atoms themselves.

How Molecules Change Partners.

Starting with the simple hexose sugars, it is found that if the sugar molecules are united with other molecules of sugars of the same general type new and different sugars are formed. For example, if a molecule of dextrose is united in a certain manner with one of levulose, sucrose or cane sugar results, which has a formula written $C_{12}H_{22}O_{11}$. It will be noted that in this formula something has been eliminated in this union, namely H_2O, which is the chemical formula for water. This molecule of water is eliminated but when the cane sugar is again split into its component parts, or as we commonly state it, inverted into dextrose and levulose, a molecule of water must again be incorporated. This same addition of water occurs in the splitting of all complex carbohydrates into the simple sugars, and the process is known as hydrolysis.

If two molecules of dextrose are properly united, the resulting sugar is maltose or malt sugar, with the same general formula as cane sugar, and when maltose is hydrolysed only dextrose is formed. If dextrose and galactose are

properly united, they form milk sugar or lactose. There is another rather rare sugar formed by a different union of two molecules of dextrose, known as trehalose, which will be seen later to be rather interesting from the standpoint of bee digestion.

It sometimes happens in nature that three molecules of hexose sugars are united, and these unions form still different sugars, known because of their composition as trisaccharides. Melezitose is one of these, and many beekeepers will recall that several years ago this sugar was found in some honeydew gathered in Pennsylvania. Previous to that finding, this sugar was exceedingly rare, selling for several dollars a gram for laboratory use; but now the supply is much more extensive, thanks to the gathering of it by the bees in various parts of the country.

Relation of Starch to Sugar.

When molecules of simple hexose sugars are united into molecules of considerable complexity, there result a wide variety of different compounds. Starch is such a complex assemblage of sugar molecules. Just how many hexose sugar molecules are united to form starch is still a matter of doubt and need not concern us here. The formula is commonly written $(C_6H_{10}O_5)n$, indicating that the indicated number of atoms of carbon, hydrogen and oxygen are combined an indeterminate and variable number of times. Starting with starch as a highly complex carbohydrate, it is found that on partial hydrolysis other substances are formed which are soluble in water, while starch is not, and which differ from starch in many essential respects. These are dextrins, which are sometimes found in honeys or more commonly in honeydew honeys. This is the material which is used to back postage stamps and is a constituent of corn syrup. If the dextrins are further hydrolysed, a disaccharide sugar is obtained, namely maltose, and if this in turn is hydrolysed the result is dextrose, one of the components of honey. Corn syrup, or commercial glucose as commonly manufactured, is a mixture of dextrin, maltose and dextrose. Since dextrins are not sweet to the human taste this partially accounts for the lack of sweetness in commercial glucose.

The Mysterious Enzymes.

So much for the chemistry of these numerous compounds which enter so largely into the human diet as well as into that of the bees. Mention has been made of the breaking up of the more complex sugar compounds by hydrolysis. If starch, for example, is placed in water and boiled, and if to this boiling mixture an acid is added, the starch is hydrolysed, first into dextrins, then into maltose and finally into the simple hexose sugar dextrose. It is by somewhat this method that corn syrup is manufactured, but in that case the hydrolysis is not carried to completion, and a mixture of carbohydrates results. Similarly as every beekeeper knows from the preparation of sugar syrup for feeding, cane sugar can be split into levulose and dextrose by boiling with weak acid, and in the same manner any of the carbohydrates mentioned may be hydrolysed. In nature and in normal digestive processes, however, there is no boiling and no hydrolysis by the action of acids, except possibly in one interesting case in human digestion. In the economy of both plants and animals hydrolysis occurs through the action of a number of remarkable chemical compounds known as enzymes.

When an enzyme acts on starch, the starch is hydrolysed without heat and at the end of the process there is as much of the enzyme present as there was at the beginning, since the enzyme itself is not used up in the process. In the case of starch hydrolysis, it is probable that several enzymes are involved, one for each of the several steps already mentioned, but the combination of enzymes is commonly called diastase, a component of the human digestive juices. In the same fashion during digestion cane sugar is split into its two simple constituents by means of another enzyme, known as invertase. Invertase is without action on starch, and diastase has no action on cane sugar. Without going into the complete list, it is believed that each of the steps in the breaking up of complex carbohydrates and the hydrolysis of each complex carbohydrate compound requires for its action a specific enzyme, of which there is a great assortment in nature.

Can Bees Digest Starch?

If with this basis bees are tested with various carbohydrates to determine whether they serve as food for the bees, one is able to determine whether they have in their digestive equipment the enzymes which act on these carbohydrates. If bees were able to derive nourishment from starch, then we would conclude that they contain the series of enzymes known as diastase; if they can live on cane sugar then it is certain that invertase is present, since each complex sugar must be split into the simple sugars before absorption and assimilation can occur. It thus becomes a fairly simple matter to take a census of the enzymes contained in the digestive juices of the bees, merely by feeding them chemically pure carbohydrates with no other food. Since it is known that bees can live for a considerable time without any food other than carbohydrates, this greatly simplifies the

procedure for this particular animal.

In physiological investigations of the kind here indicated the common procedure is to remove part of the organ of the alimentary tract which is to be tested and to extract the enzymes by means of glycerine or weak alcohol. This solution is then tested on various solutions of carbohydrates to ascertain whether it exercises any action such as has been mentioned as hydrolysis. This has been done with the alimentary tract of the honeybee by several investigators and they have all reported finding in the alimentary tract the enzyme diastase which acts on starch, and as a result it has been repeatedly stated that bees are able to digest starch. As has been said the term disastase probably covers a series of enzymes which act on the various intermediate compounds, bringing the action to completion by the hydrolysis of the materials until dextrose is produced. If bees were able to hydrolyse starch, then one would expect them to be able to digest the various dextrins without difficulty, these being compounds intermediate in complexity and also steps formed in the transformation between starch and sugar. Honeys which are dark in color often cause the condition known as dysentery and the characteristic difference between these dark honeys and those that are lighter is chiefly a higher per cent of dextrin in the darker honeys. Mr. Demuth and the author when working on the wintering problem were led to believe that bees are unable to digest dextrins and that this inability is the underlying cause of dysentery. All the weight of scientific evidence seemed to be against this theory and the problem was one which demanded careful attention.

Testing the Honeybee's Digestion.

Instead of making extracts of enzymes and of testing them by complex chemical methods, another and far simpler method was available in the case of the honeybee. Cages containing 200 or more worker bees were used. To one cage nothing was given except water, this being called the starvation check. Other cages were fed various other chemically pure carbohydrates, and, for a check on the other end of the series, a cage of bees was fed good honey or chemically pure cane sugar. Usually both were used as a further check.

Naturally the bees that received no food died within a relatively short time. As has been pointed out elsewhere, the rate of death of honeybees without food is remarkably rapid, and it is strange that any animal should succumb in so short a time without food. The starved bees began dying soon after they were put into the cages, and the average length of life is often only a little over one day. It was found that in all cages the death rate is changed by the temperature conditions, so in most of the experiments the cages were kept in total darkness and in a cool place, and all cages in each set of experiments were kept together. The death rate on cane sugar or honey is about the same, and as one would expect the bees fed honey lived several times as long as those without food.

It thus becomes possible to determine whether the foods offered to the bees and taken by them act as nourishment to them. If they die at the same rate as bees without food, the food taken is considered as not available to them, presumably because of a lack of the proper enzymes; if on the other hand they live about as long as the bees on honey or cane sugar, then it is concluded that the food is available to them and that they have the necessary enzymes to hydrolyse the carbohydrate food offered them. By this plan it was possible to test many different carbohydrates and to list the enzymes certainly present in the alimentary tract of the normal worker bee.

Of the simple hexose sugars, it was found that bees are able to utilize dextrose and levulose, the two common components of honey, but that they are unable to utilize mannose or galactose. They were found unable to utilize certain still simpler sugars, known as pentose sugars, such as xylose and arabinose.

Can Bees Digest Any Kind of Sugar?

Of the sugars composed of two simple hexose sugars, they are able to utilize cane sugar, as every beekeeper knows, and they are also able to utilize maltose. They are unable to utilize lactose or milk sugar, and when fed this sugar they die as fast as if starved. A rather striking finding is that they are able to utilize trehalose, a sugar abundantly found in fungi and in certain mannas of the old world. It seems rather doubtful whether any honeybees ever tasted this sugar previous to this experiment, yet they were able to live on it apparently as well as on cane sugar. They therefore contain the necessary enzyme for hydrolysing it, even though it must be to them an exceedingly rare article of diet. This sugar is so rare that it sells for one dollar a gram, so that it is not expected that it will used widely in the diet of either bees or humans.

Of the trisaccharides, they thrived on melezitose and starved on raffinose. This is somewhat surprising since the enzyme invertase is supposed to have some action on raffinose, but if this is the case the action is so slow as not to prevent starvation. As has been said, melezitose

is a rare sugar which has recently been found in certain honeydews, probably always having their origin on certain coniferous trees.

The remainder of the rather long list of carbohydrates tested may be summarized by the statement that the foods are all unavailable. Among those tested were dextrins, several starches, soluble starch, inulin, glycogen and other highly complex carbohydrates. Certain mixtures of carbohydrates were also tested and it was evident from the results that honeydews and commercial glucose were harmful to just the degree to which they contain dextrins or other unavailable carbohydrates.

Unmodified Starch Grains in Alimentary Tract.

Since earlier workers claimed that bees are able to digest starch since they had found the enzyme diastase in the alimentary tract, some of these findings here recorded were astonishing. Just as this work was well along and about ready for some publication of the results, a lengthy paper appeared by two Russian workers who reiterated the statements that the alimentary canal of bees contains diastase. To test this still further, two cages of bees were fed a mixture of soluble starch and honey, since on the honey at any rate they could remain alive for some time and they would thus take into their alimentary tracts considerable amounts of starch. Bees were examined which had been on this mixture for various periods and the contents of the entire alimentary tract examined with care. The contents of the entire alimentary tract were stained with iodine, which turns unmodified starch deep blue. If there has been any action by diastase on the starch it fails to take on the deep blue color with iodine and at one stage of the transformation by hydrolysis stains red and at another stage takes no color whatever. At later stages the modified starch becomes soluble and does not stain with iodine when in solution. It was found that every grain in the alimentary canal was deep blue when stained with iodine, and that even at the tip of the rectal ampulla there were thousands of unmodified starch grains. This confirmed the previous findings that bees do not contain diastase, or at any rate they are unable to utilize starch as food.

The mystery was not entirely cleared up by this experiment, except that certain observations tend to explain the differences in results of the two methods. When the entire alimentary canal is stained with iodine, the surrounding muscles stain deep brown, this being the characteristic stain for glycogen. It appears that these muscles act as glycogen storage space, and they thus doubtless contain the enzyme necessary for the storage of glycogen and for its later breaking down into dextrose. Since the enzyme which acts on glycogen is apparently identical with starch diastase, it therefore appears that in studying the enzymes of the alimentary tract other workers have actually extracted the enzymes from these muscles instead of from the lumen of the alimentary canal, from which place they evidently thought they were obtaining it. This tends to strengthen confidence in the method of feeding chemically pure carbohydrates rather than the method of extracting the enzymes, and at any rate offers a tentative explanation of the difference between the results obtained in this work and in that of all other workers in this field.

The Cause of Dysentery.

It appears that the honeybee has a highly specialized digestive apparatus and that the carbohydrate foods which it is able to utilize are exceedingly limited in number. If these findings are correct, then the ultimate cause of dysentery is certainly their inability to hydrolyse dextrins which often occur in the darker grades of honey and in honeydew honeys. This also explains why bees fed on molasses, cheap sugars or commercial glucose develop dysentery, as they do when these materials are used for winter food. The utilization of carbohydrates by various animals varies greatly, usually according to the food which they usually take, but there are a few known cases where an organism contains an enzyme which it rarely or never is called upon to utilize. It is, therefore, not so striking that they are able to utilize trehalose, a sugar which evidently no American bees, at any rate, ever tasted before these experiments.

The title of this paper does not limit the discussion entirely to carbohydrates. No experimental work has been done on other classes of food, but an observation was made which is of interest. When the alimentary canals of the various bees in these experiments were examined, it was found that when stained with Sudan III, used in staining fat, there are myriads of fat globules in the rectal ampulla associated with empty pollen shells. Apparently the fat component of pollen is not utilized by the workers, or at any rate it is mostly not utilized. If none of it is utilized this would show a lack of the enzyme necessary for fat utilization. Certain experiments would indicate that some proteins are not utilized, although the work on this line is too small to be significant. Taking the whole field, the bee evidently is particular as to its diet.

Washington, D. C.

WHO SHOULD SELL HONEY?

By Jay Smith

800,000 Honey Salesmen in the United States but not Many are Working at the Job

To sell honey I believe is the duty of every beekeeper, queen-breeder, supply manufacturer, publisher of bee journals and books and every one who is in any way interested in beekeeping. There is a great field for missionary work along this line, for there is so little honey consumed per capita and we find so many families where honey, the most delicious and hygienic of all sweets, is a stranger to the table.

The bottlers of honey have done and are doing a great thing for the beekeepers. The beekeeper would indeed be in a deplorable condition if it were not for the bottler. Bottled honey can be found on the shelves of nearly all grocers, and while most grocers sell only a little in the course of a year, they sell enormous amounts in the aggregate. Years ago I bottled honey and sold it through the wholesale grocers. I discontinued it for several reasons. In the first place, I could not produce the same kind of honey each year, and the customers complained when there was a change, thinking I was putting something over. I found it was best to buy. At last I woke up to the fact that the large fellows could do a bottling business better than I.

Why Honey Sells Slowly.

However, there was one plan I adopted that brought results, and if any beekeeper who bottles honey gives it a trial, I believe it will bring results. I went to the grocer and asked if I could interest him in bottled honey. His reply usually was, "Nothing doing." He would point to a paper carton back on the shelf and say he bought a case of two dozen a year before and had 18 left. He would say there is little call for honey. In my soul I thought something like this: "You big chump, how do you expect people to come here and 'call' for something they don't know you have? Why on earth don't you drag that box of honey out of its retreat and sell it to the people instead of waiting for them to 'call' for it. You are some salesman I say."

Of course, I did not say that; I just thought it. What I really said was about like this: "I agree with you heartily, as of course I realize you know your business from A to Izzard. However, I have a plan by which I can help sell it, and I am not asking you to buy any honey at all. If you sell it, you can pay for what you sell and if you don't, I can take it back." Now that usually interested him, for most drummers come in to get some of his money.

Value of Window Displays.

My plan was this: If he would give me the use of his show window for a few days, I would put on a display, and when it was over he could pay for the honey he sold, and, of course, if he wanted to take any more, I would not object. I arranged an attractive display of all sizes of glass packages from a ten-cent size up to a five-gallon bottle. The prices were marked on each. I went by several times and always saw a group of children looking at the honey. Several cases were sold and then the grocer would begin to sell from the display. At the end of the allotted time I went in and the first grocer said, "We have sold more bottled honey in the last week than we ever sold before in two years." He kept a number of cases and had a good trade.

This plan worked equally well with others, but in buying this honey I got American foul brood, so I discontinued buying honey. Other beekeepers write me that they will not buy honey for this reason. If we clean out American foul brood we can greatly increase the sale of honey, but that is another story. Foul brood has been cleaned up for miles around me and has not been a menace for many years. Some years I got quite a crop of sweet clover honey and about the time I got a trade worked up at some cost, the honey was gone. So I decided to buy honey when I ran out and keep the trade supplied. I am careful, however, not to buy from diseased apiaries or from localities where American foul brood exists, if I know it. So I decided to work up a trade in honey to keep us busy in the winter, for the queen business requires little work then.

Selling Direct to Consumers.

I decided to sell direct to the consumer in five and ten pound pails and deliver it. I had read how others sell honey, and I decided to follow their advice. They told me that if you practiced "Roadside Selling" all you had to do was to paint a sign, set out your honey in the morning and take a load of money to the bank before closing time in the afternoon. Next day you would place your order for a Lincoln sedan, turning in your old Ford on the deal. So we put up a big sign about a hundred feet off the road. I made up my mind that that sign was deaf and dumb, for it did not seem to get the message across. After about a week the first victim arrived. He

had seen the sign. Well, we sold a little from that sign; but I decided the customers were near-sighted and I put a sign right down by the road so it would be read coming and going. This sign draws much better than the first, but we still have Lizzie.

I then tried newspaper advertising. I was informed that if you put in an ad the telephone could not handle the business and you would have to put in several. We got some business, but one telephone can handle it, even allowing a few hours a day that my wife talks to her club women about—but I am not the one to air family troubles. I then tried passing small samples. They assured me that if once they got a taste of honey all the bank robbers would lay off from the banks and at the point of a gun demand that I sell them some honey. It hasn't happened exactly that way, but it increased the sales.

But I have learned some important facts about selling honey that are encouraging. All three of the methods mentioned are paying and the sales are slowly increasing. At first when I advertised in the papers, I was a little discouraged, for the expense ate the profits. I found, however, that a small ad brought as good results as a large one, so I cut down on space. Later, when the queen season opened up I discontinued advertising, but the sales kept right on. I found out that in advertising I got permanent customers that buy honey regularly, so it pays to spend some money to get a customer. In the fall I mailed a postal card to each of the former customers, and the response was excellent.

Overcoming Prejudice Against Extracted Honey.

Many people are prejudiced against "strained" honey. But when they get a taste of it, they are convinced. In distributing samples a half-ounce bottle was used. They hold three-fourths of an ounce of honey. They can be purchased from the factory for $2.60 per gross with corks. We had a circular printed describing how liquid honey is produced. I never use the word "extracted" honey. They say they don't like "honey extract" or "extract of honey." I never use the word "granulated" either, for that means that the honey has turned back to granulated sugar from which they think it is made. We say "liquid honey" and "crystallized honey." Most people have never heard of the process of throwing the honey out of the combs by a "honey separator" (never an "extractor").

We passed out samples to a part of the city, and it has added a number of permanent customers. We expect to do the entire city next year. I learned another thing when passing samples. The children would eat honey if their parents would get it for them, so that is an argument. People will buy for their children when they would not buy for themselves.

By the methods described one can build up a permanent trade that will pay. The honey must be uniform. I have found that they like the light mild honey. Sweet clover goes finely. With a blend

The honey sign should be located where it will be seen for a considerable distance from both directions. The driveway leading from the road invites the motorists to drive off from the highway, thus preventing a blockade on the pavement.

of white clover or alfalfa it gives the best of satisfaction. In fact, I have not heard a single complaint but plenty of enthusiastic praise. Our crop here is uncertain, so I have to buy honey as near like our own as possible. If one has a crop and sells in the way described, it will take money and labor; but, if he expects to do a permanent business, the expense of selling is small.

Let us all devise ways to sell more honey and tell each other our methods, and in that way honey will come to its own and the beekeeper will have a ready sale at a price that is fair to himself and the customer.

Vincennes, Ind.

[With 800,000 or more boosters for honey in the United States, each considering it his duty to push sales in his community and to see that honey is available for his customers throughout the year, it should not take long to teach the American people the honey habit. When that time comes the ill-flavored and almost unedible table syrups will no longer be purchased in preference to honey. —Editor.]

SOME PACIFIC COAST BEEKEEPERS

By Dora Stuart

A Well-known California Beekeeper Who Knows How to Enjoy Life

About 65 years ago, away back in Wisconsin, a genuine beekeeper was born. The newcomer was quite unware of his real destiny. So were his father and mother, who no doubt regarded him as the future president of these United States. They were not wealthy, but among other gifts his parents endowed their son with a treasured inheritance, the fine, imposing old name, John Duncan Bixby.

John proved to be a docile child, and while still very young cheerfully accompanied his parents to Iowa. He evinced no special aptitude either as beekeeper or president until at the age of fifteen when he was compelled to strike out for himself. He then displayed unmistakable talents for both occupations. With a natural tendency toward agriculture, coupled with inherent executive ability, he began his career as beekeeper in connection with truck farming, and peddled his wares himself.

John remained many years in Iowa and married there. He farmed with indifferent fortunes and finally persuaded his wife to leave that state. With their three remaining children, the first having died in infancy, they moved to New York State where he secured a tract of land in the buckwheat belt only a short distance from the noted beekeeper, Alexander, under whose guidance John Bixby laid the foundation for his future work with bees.

Migration to California.

The climate in New York proved severe and after 12 years he migrated to California for his wife's health, landing in Los Angeles. He secured a newspaper route on one of the large dailies, but after a year of this life, his wife having passed away meanwhile, his children persuaded their father to accept an offer to trade the route for a home in Covina, California, about 20 miles from Los Angeles. He again engaged in beekeeping, beginning on a very modest scale, and for a few years had to supplement his earnings from the production of honey by horticultural work about the town of Covina during the winter months. A large percentage of the private lawns and those surrounding public buildings are perpetual reminders of his patience and skill.

In 15 years he has seen Covina grow from a village to a town of about 3,000 inhabitants, and has played a prominent role in popularizing orange honey, which had not been considered of much value as compared with sage honey when he began producing orange comb honey in sections. He produces only so much extracted honey as the needs of his trade demand.

Becomes Editor of the Western Honey Bee.

Bixby must have inherited something of the versatility of his father, who was

J. D. Bixby, wife and daughter, camping "above the sage" at 5000-foot elevation, where California scenery and sunshine combine to make such a vacation a great delight.

first a school teacher, then merchant, and finally Methodist minister. After farming, newspaper work, gardening and beekeeping, John Duncan Bixby's literary gifts, as well as his experience with bees, were recognized by his appointment in October, 1913, as Editor of the Western Honey Bee, the organ of the California State Beekeepers' Association. For nearly six years that journal throve under his management, its pages sparkling with his wit and wisdom. On the very first page of the very first issue, April, 1913, then edited by George L. Emerson, may be found one of Mr. Bixby's most amusing bits of verse cleverly illustrated and entitled, "When Father Boils the Wax."

All his writings express the enthusiastic apiarist just as his beeyards and methods express the individuality and beauty-loving nature of the man.

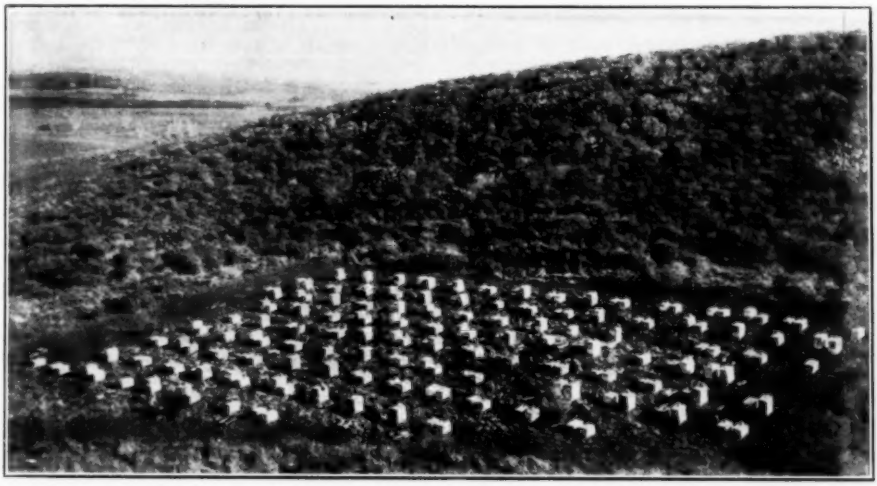
Uses Eight-frame Equipment.

His equipment is mostly eight-frame redwood hives, as he finds it much easier to force the bees up into comb-honey supers from smaller hives. His covers are contraptions of his own, wholly satisfactory to himself. They are made from sawed redwood shakes nailed on two sides of a piece of redwood one and one-half inches by the length of the hive, twenty-two inches. This makes a light, double, ventilated cover. To keep out the rain he nails over the top a sheet of tin cut from large cans in which a spray for orange trees is shipped. The top is then painted and the whole held in place with a heavy rock. Such a cover costs from 9 to 10 cents each. It is light, cool and dry. His other equipment is standard, modified here and there to suit his convenience.

Mr. Bixby has trafficked in bees to a considerable extent, disposing of bees for apiarists who became discouraged or who died, and selling enough of his own increase each year to keep his apiary down to the number he believes one man can handle and do justice to the bees and to himself. He follows with success the Alexander method in making spring divides.

Public Spirit in Beekeeping Affairs.

Personally, Mr. Bixby is a man of warm impulses and a sense of justice and fair play that makes him a natural arbitrator sought after in his own section by beemen who come into the neighborhood. He tackled the question of bee locations and solved it to the satisfaction of all concerned by requiring, after a careful consideration of the amount of pasture and volume of nectar flow, each person to keep his bees at least a mile distant from his nearest neighbor beekeeper. Public spirit led him into taking a prominent part in the endeavor to establish a successful co-operative marketing exchange for California honey, and the disastrous results were a great disappointment to him. During all these years of public service to the beekeepers of the West, he was planning a little home for old age, and in January, 1920, he realized that dream.



One of J. D. Bixby's apiaries near Covina, Calif. In the valley beyond are great orange groves, and on the hillsides is the sage.

Enjoying His Country Home, Garden and Bees.

His joy at being able to retire to private life at Casita Mira, "The Little Home Long Looked-for," was expressed

in a poem published privately as a card of greeting to his old friends.

OUR POINT OF VIEW.

One man clings to the thick of things
Where fortunes are made in strife,
For the wild turmoil of the city's toil
Is to him like the breath of life.

Another looks to the hills and brooks
And the glen where the willow waves;
For the hum of the bee and the bird's revelry
Are the joys that his being craves.

And the Giver of Gifts—when the veil uplifts
And the Mystery is understood—
Will say: "In his place each has finished his race.
And behold! unto Me it is good.

From this safe retreat he sends, from an apparently inexhaustible well of information always on tap for the beginner young or old struggling against the handicap of poverty or ignorance, weekly letters on all phases of beekeeping—spring management, requeening, care of equipment, locations, clarifying honey, markets, and treatment of bee diseases, to beekeepers everywhere who read "Orchard and Farm."

After 50 years of practical beekeeping the score stands in favor of the bees. Through their co-operation Mr. Bixby was enabled to educate and to place in positions of usefulness his three children: John, Jr., an emergency man for the Southern Gas & Electric Company; Arthur as a newspaper man in Honolulu, and Dorothy, a graduate of the Los Angeles Normal School where she specialized in domestic science, as a teacher. Besides, the bees helped gain for him the little retreat in which to grow old leisurely and beautifully with Mrs. Eugenia Bixby, the second wife who has been such an understanding helpmate.

In a recent private letter Mr. Bixby writes:

"Mrs. B. has had a wonderful flower garden this year. I had a moderate crop of orange honey and for two months have been so busy with beans and walnuts as almost to forget that I had any bees. Am almost a rancher—old straw hat, overalls n'everything."

Like Dr. Miller, there will be more to say about Mr. Bixby when he shall have spent another decade among the bees, making 60 years of close touch with nature. Until then, adieu!

Chico, Calif.

LEARNING AND UNLEARNING

By Leslie Burr

How the Honey Crop is Greatly Increased by Intelligent Management of the Brood Chamber

Following the Spanish-American War and the advent of American beekeepers in Cuba, large crops of honey, that some of the Americans secured, were a matter of wonderment to the native beekeepers. One native beekeeper, noticing the amount of honey that Hockstein was shipping, asked how it was that his bees did not gather as much honey as did Hockstein's bees.

Hockstein, who was considerable of a wag and liked few things better than a joke, explained to the Cuban that it was a matter of tin pails and night shifts; that his bees had been taught to gather their honey in pails, which they carried, one in each hand, thereby being able to bring to the hive bigger loads of honey than the bees of the Cuban. He further explained, when working nights the bees gathered only half as much honey as during the day, by reason of the fact that they could carry but one pail at night, the other pail being discarded for a lantern.

The Art of Spreading the Brood.

The difference, of course, in the crops obtained was principally a matter of hive management, and there were few things in hive management of near the importance of brood-spreading. I have previously stated that brood-spreading "is an art"; and, based on my own personal knowledge of beekeepers, I believe that there are fewer who have mastered all the fine points of brood-spreading than any other hive manipulation. Even in the A B C and X Y Z of Bee Culture the subject is treated with caution. The author of the article, while admitting the possibilities of brood-spreading, advises the average beekeeper to let it alone, allowing the bees themselves to determine the size of the brood area of the hive.

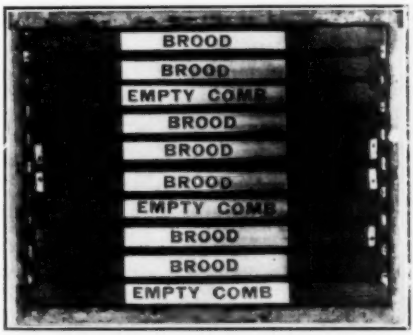
Personally, I have found brood-spreading of importance whenever conditions were such as demanded it wherever I have worked bees.

For instance, I once kept bees in the city of San Diego, California. They were located not far from Balboa Park, where they had a wide variety of pasturage, and it was my experience there that brood-spreading was a very important part of the brood-chamber manipulation in order to get the bees in proper condition for the early spring honey flow.

In Hawaii, particularly on the Island of Maui, where I once lived, I found that brood-spreading was of great importance in the matter of getting the bees in proper condition for the algaroba honey flow. Ordinarily, perhaps, it need not be practiced in the eastern and central states. Yet, I once found it of great value in Illinois, in the building up of a lot of nuclei that I had made, following heavy winter losses.

But by reason of the peculiar conditions existing, at least during the years I was in Cuba, brood-spreading there was of more importance than in most places. For in Cuba, not only was brood-spreading necessary in getting the bees in the best possible condition for the aguinaldo or bellflower honey flow, but brood-spreading had to be continued through the long winter honey flow. There the practice was to take all the honey from the brood-nest and spread the brood every time the yard was extracted. When this was not done the brood-nest became plugged with honey, brood-rearing would just about cease, and by the time the honey flow was half over the field force of the colonies would amount to about a corporal's guard.

Arrangement of brood and empty combs when a colony has brood in only five combs.



Arrangement of brood and empty combs when a colony has brood in seven combs.

Proper Method of Brood-Spreading.

As to the proper method of spreading brood, it is something like setting a hen. There is a limit, and a very definite limit, as to the number of eggs a sitting hen can cover; likewise there is a limit, and a very definite one, as to the amount of comb that a colony of bees can cover, and whatever brood-spreading is done, it never should exceed the limits of the space that the bees can cover.

A second point to be remembered is always to work frames of brood in not less than pairs, that is, never separate or set off one frame of brood by itself. For example, if a colony has five frames of brood and enough bees to cover six frames, the five frames should be separated and the empty comb inserted, three frames of brood being on one side and two on the other of the inserted comb. Seven frames of brood, for example, where there are enough bees to cover nine combs, would be spread, two, three and two. The method is to take out the comb or combs next to the side of the hive, shift over two frames of brood and insert one empty comb. Then do the same on the other side, leaving the three combs of brood in the center of the hive.

Importance of Old Dark Combs for Brood-Spreading.

Another point I wish to make is that the kind of combs which are used in brood-spreading is important. Under ordinary conditions when a queen naturally is enlarging the brood area of the hive, the kind of combs seems to make but little difference, the queen if anything seeming to prefer new comb. But where the bees naturally are restricting the brood area of the hive, better results are obtained by using combs that have previously contained brood. Black combs that have been cut clean and smooth with the uncapping knife are the kind that get the best results.

If a new comb is placed in the brood-nest the bees seem to put honey in it more readily, and the queen seems not so willing to lay in it. So spreading the brood-nest with new white combs at a time when the beekeeper is fighting for brood generally means but a frame of honey in the brood-nest.

Basic Principles Applicable to Any Locality.

While I have designated the successful practice of brood-spreading as "an art," I further desire to say that it is no more

of an art than the rearing of good queens, or the successful handling of the brood diseases. To do any one of these three things properly the operator must have, first, a thorough basic knowledge of his subject; and, second, he must use good judgment and exercise great care, if his efforts are to be crowned with success.

In getting all the work possible out of a colony of bees, the operator must thoroughly understand brood-nest management. Indeed, it is my opinion that, if a man has a working knowledge of bee botany, a basic knowledge of the position and motion of the stars and thoroughly understands brood-nest management, he could be blindfolded and transported to any place on the earth's surface, and, if given some bees, could successfully work them with scarcely a hitch.

For his knowledge of botany would give him an idea of about what to expect in the way of flora; the stars and their movement would tell him his position on the earth's surface and seasonal changes to be expected; and his knowledge of brood-nest management, based on his knowledge of the flora and the progress of the seasons, would carry him through the year hitting on all cylinders, to use the current expression.

Willits, Cal.

STERILIZING COMBS CHEAPENED

By E. R. Root

How Expense Can be Reduced to Two Cents per Comb for Material

We are treating here at Medina some 700 combs showing American foul brood scale. Some of these combs contained the disease in the advanced stages of development, as will be shown further on.

Some interesting sidelights have developed since we began this work, that go to prove pretty conclusively that winter is the best time to apply the new treatment. When the weather is cold, the amount of evaporation of the solution is considerably less than in the summer time. This is shown by the fact that Mr. Barber, who treated some 6000 combs during the last summer, was able to sterilize only about 60 combs to the gallon of solution. During this winter we have been able to increase the number to 70 with no better apparatus or equipment. At a summer temperature of 70 to 80 degrees it is apparent that there is very much more rapid evaporation than when the temperature is between 40 and 50 degrees in the winter.

Another sidelight is that during the cold part of the year there can be no possible danger of robber bees getting at the combs under treatment. Winter is likewise the dormant time of the year in beekeeping when hundreds if not thousands of combs will be out of use and in storage; and it is at that very time that beekeepers will have more leisure to apply the treatment.

The Economy of the Hutzelman Treatment.

According to our results, the solution per comb costs slightly more than 2 cents. The labor of doing the work is an additional 1½ cents. This labor is calculated on the basis of 50 cents an hour, making the total cost per comb for treatment, ready for next season's use, only 3½ cents.

In our December issue we told what it costs to melt up the combs and replace them with frames of full sheets of foundation, which cost is in the neighborhood of 18 cents per comb. (See Gleanings, December issue, page 790.) Combs treated by the Hutzelman solution at a cost of only 3½ cents are far better than frames of foundation at 18 cents, as any beekeeper can well see.

Perhaps it would be interesting to beekeepers to know how we came in possession of so many combs that were diseased.

Hospital Yards.

It is getting to be more and more the practice among large beekeepers throughout the country to establish a hospital yard where all diseased colonies and all other colonies under suspicion may be sent for treatment and cure remote from the healthy bees. The A. I. Root Company has just such a yard. In this yard are placed any colonies from other yards that show any suspicious symptoms. Even if a single cell of brood does not show just right in a colony otherwise healthy all through, the whole colony is sent to the hospital yard. Also there are some small beekeepers in the neighborhood of some of our yards. If their colonies show disease we either buy them up or treat them then and there. Those that we buy up will go to the hospital yard for observation and treatment. In the course of the season there may develop a hundred diseased colonies at the hospital yard through the efforts to make our whole territory clean.

During this winter season when no bees can fly, we are treating from this yard some 700 combs showing American foul brood scales. These accumulated during the season. For the purpose of experiment, we have allowed some diseased colonies to run in order that their combs might become rotten with the diseased material. Figure 1 shows some of the worst we are now treating by the alcohol-formalin solution, the treatment with which was described in our last November issue.

The Hutzelman Treatment in Brief.

For those who do not happen to have that particular issue handy, I will explain that the treatment consists in immersing all combs from diseased colonies in the alcohol-formalin solution for 48 hours. All that is necessary is to uncap and extract the honey before immersing. To prevent the alcohol from becoming fouled up with honey, it is advisable first to soak the combs, after extracting, in water for a few hours, and then extract out the honey and the water—of course, allowing the honey water to run into the sewer or into a container, to be boiled later.

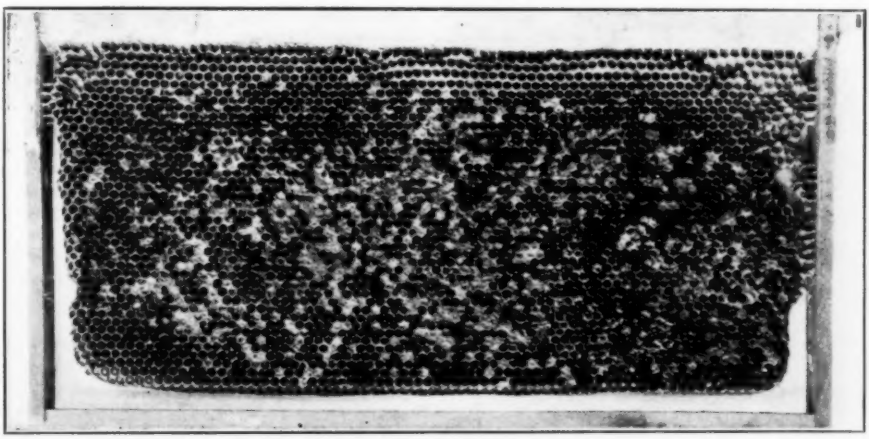


Fig. 1.—Comb of American foul brood in advanced stage. The mate to this comb, just as bad, was submitted, after treatment, to the Government bacteriologist, Sturtevant, and found to be entirely free of live germs.

The Hutzelman Treatment on a Large Scale.

The mode of applying the solution on a large scale is shown in the accompanying illustrations. In our case we have built a special tank that will take three tiers of combs, or 69 combs in all. Each tier of combs is held in place by outwardly projecting angle-irons at the proper distance apart, riveted to the sides. Each of these angle-irons is about one inch short of the inside length of the tank, so that the last comb can be slipped in and under the pair of irons. This is precisely the scheme used by O. E. Barber, described in the November issue. Any of our subscribers can obtain a copy of this article by writing to this office.

We have modified the plan somewhat, in that our tank is made to tilt on an angle on one corner, as shown in Figure 2. In this position the combs can be slipped in place before the tank is filled with the solution. When they are all in, the tank is tilted back to its vertical position, after which the cover is put on. The big metal drum or barrel holding the solution is then lifted to the proper height by means of a chain hoist, when the solution will gradually work its way through the rubber hose into the tank and into the cells of the combs. It is better to have the solution creep into the cells slowly than too fast. After the tank is filled, and all the combs are submerged, they are allowed to soak for 48 hours, at the end of which time the empty drum is lowered to the floor, when the solution, by the reverse process, works backward into the original container by its own gravity. The combs in the tank will, of course, be wet with the solution. They are given a shake over the tank as shown in Figure 5, this side and that side, when they are next put into the extractor to be cleaned still more. They are then put into supers, when they will be ready for use the following spring.

While it may not be necessary, we believe that the tank, after it is filled with the combs and the solution, should be tilted this way and that in such a

way as to allow the air bubbles to escape from the cells. When the mouths of the cells are higher than the bottoms, the air bubbles, if any, will escape.

As will be seen by Figure 1, some of the combs we are treating are about the worst-looking specimens one ever saw; but we know from past experience that these combs can be sterilized, even in case the cells are sealed over, because the solution penetrates the brood cappings, and forces its way into the cells. Alcohol, unlike water, has such a low

Fig. 2.—The tank is held in a tilted position by a chain at the back end for convenience in filling it with combs.

surface tension that it forces itself into the cells and displaces the air. While we take the precaution to uncap all the cells containing honey, extracting and washing them out, we pay no attention to the capped brood, for these cappings are so porous that the solution readily passes through them.

Much stress has been laid on the importance of not allowing a single cell of honey to escape when being uncapped; but our apiarist, M. J. Deyell, showed me some capped cells of honey which he had left sealed. Remarkable to relate, when he removed the cappings of those cells the honey was gone, and there was evidence that the solution had displaced the honey, sterilizing even these cells.

Impracticability of a Beekeeper's Making Up His Solution from Ordinary Denatured Alcohol.

Some beekeepers have the idea that they can make their own solution by buying the denatured alcohol and putting in their own formalin; but Dr. Hutzelman points out that most denatured alcohols are unsuited for the purpose. There are, he says, something like 90 formulas of denatured alcohol on the market. Most of them contain either the deadly poison nitro-benzol or pyridin. Either of these, he says, will remain in the comb after being aired for a long time; and that if the combs are put back in the hive, the brood, after being started, will be poisoned. It would die, not because of American foul brood, but because of the poison; and the beekeeper would conclude that the treatment was not effective.

Of course, ordinary grain alcohol would do if it could be obtained in this country at a price. Such alcohol could be procured in Europe.

How the Small Beekeeper Can Apply the Treatment to a Few Combs.

It is not necessary to have the elaborate equipment described above if only a few combs are to be treated. A small tank to hold ten or even five combs is all that is needed. If the beekeeper finds that he has a colony that has foul brood,

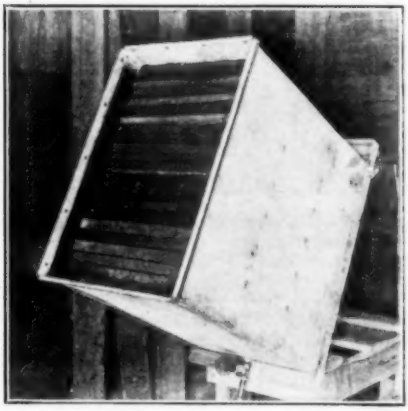


Fig. 3.—Tank filled with combs ready to be let down in normal position. Note how frames are slipped under the angle irons to hold them down when the liquid is turned on.

he can during the evening shake the bees on to the frames of foundation in the regular way, then treat the combs at night when no bees are flying. All capped honey should be uncapped. The combs should then be soaked in warm water over night. The honey and the water can be shaken out, or, better, extracted, if one has an extractor. It is, perhaps, unnecessary to repeat that the honey water and washings should be run into the sewer or otherwise disposed of where bees will not get it. It may be boiled, or poured into a hole in the ground and buried.

The combs should be put into the tank of solution, one by one. As they are immersed they should be tilted back and forth so that all air bubbles may escape. The combs will, of course, have to be weighted down to keep them submerged. They may then be soaked for 48 hours, and given back to the bees after airing—either to those that had them originally or to other colonies.

Where one wishes to avoid the expense of a special tank he can use an ordinary 60-pound square tin can by cutting off the top. He then can fill the can two-thirds full of the solution, and dip in six or seven combs, one at a time, so that they will be a little over half submerged. At the end of 48 hours the combs can be turned the other side up, thus disinfecting the entire set. This, of course, would prolong the process and increase the manipulation; but in the case of only one colony being infected, the whole set of 10 combs could be treated in four days without any expense other than just the solution in the five-gallon can.

On the other hand, if one knows that he has 40 or 50 combs, or even 100, that he has laid aside during the summer to be melted up in winter, he can treat these combs, 10 at a time, in a 10-comb tank. The cost of doing this will be much less than melting up the combs. Our experience shows that during winter a gallon of solution will treat 70 or more combs; or, to put it another way, there is a shrinkage or loss of about one gallon of solution to about every 70 combs treated, which would be about two cents per comb for the solution.

Fig. 5.—Most of the solution is shaken out of the combs as they are taken out of the tank. They are then put into the extractor and whirled until nearly dry.

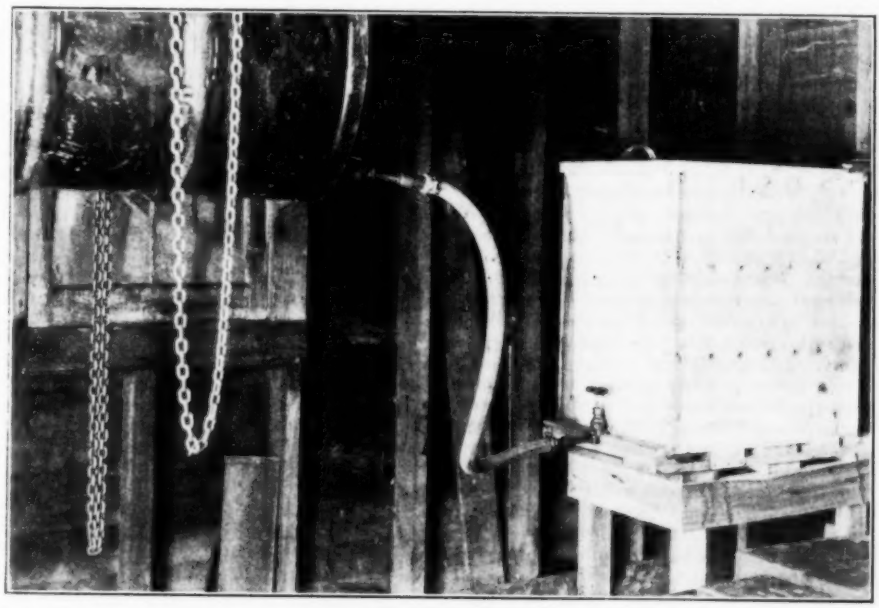


Fig. 4.—After being filled with diseased combs the tank is tilted back to its normal position and the steel drum containing the alcohol-formalin solution is raised to the position shown by a chain hoist. The tank is then filled without further attention. Forty-eight hours later the tank is emptied by simply lowering the steel drum to the floor.

FROM THE FIELD OF EXPERIENCE

PACKAGE BEES OR WINTERING

Killing Colonies in Fall and Buying Package Bees from South in Spring

In the December issue of Gleanings, on page 814, the question asked by R. Butler of Wisconsin and answered by the Editor, is, in my opinion, one of the most important questions that is now before the beekeepers of the North—more especially in the northeastern part of the United States and in Canada—where the bees have to be confined six months or more without a flight, which is often the case here in Maine. This is a problem that must be worked out by actual experimenting and careful attention to every detail, by each individual beekeeper, and that covering not less than two years. Two years are certainly not enough, unless those two years represent two of the greatest extremes as to conditions favorable for wintering and otherwise, to determine the relative value of the wintered-over colonies with the packages from the South.

I have just finished experimenting with two such years, and am now entering upon a third year, which thus far has been one of the most favorable to good wintering. The data I have gathered from these two years put the advantages all on the side of the packages—so much so that I make the prophecy that within the next decade all the most progressive beekeepers of the North will be found killing off most or all their bees in the fall, and then starting anew in the spring with package bees from the South.

There are some seasons—one of these was the fall of 1922—that are so unfavorable for brood-rearing that at the approach of winter 90 per cent of all the colonies are made up of bees which had nearly all emerged before September, and in any case would die before breeding time in the following spring. Of course, such colonies as these are utterly worthless to carry through the winter. On the other hand, with conditions as they were here in 1921 and 1923 when heavy brood-rearing continued until the end of October, a large percentage of the bees are young at the beginning of winter, and if the winter and the following early spring prove favorable so that by the first of May—the time that the package bees should arrive—these colonies have the equivalent of at least two full frames of brood in every stage of development, and if the queen is not over one year old, the wintered-over colonies might make as good a showing in surplus honey as a 3-pound package of young bees and queen from the South that is hived on built combs and given plenty of feed either combs of honey or sugar syrup. Let me emphasize that these packages should not be over four days on the way, and, to insure the quickest and best delivery, by all means use parcel post.

The amount of honey that it will take to carry a strong colony here in Maine through the period of no nectar, either in the cellar or packed outside, would be worth considerably more than a 3 pound package would cost.

Ellsworth, Me. E. W. Wooster.

[At present prices of honey and package bees, it requires from 60 to 75 pounds of extracted honey to pay for a three-pound package of bees, together with a queen and transportation charges, figuring the honey in the hives at two cents per pound less than the price in 60-pound cans, to pay for extracting and the container. It is doubtful if there are many locations in the North where this amount of honey would be consumed during the nectarless period of fall and winter as the seasons average. While killing the bees in late summer or fall and replacing them with package bees from the South may be a profitable procedure in a few localities like that described by Mr. Wooster, the Editor believes that a more fruitful field for reducing the cost of honey production for most northern localities is in a better understanding of the conditions necessary for good wintering.—Editor.]

DIFFERENCES IN LOCALITY

Building up for the Honey Flow in the North and in the Tropics

Dr. Phillips' remarks concerning "abundant supplies of honey" and "abundant room for rearing brood" are the foundation for having the bees in condition to get the honey. In the past 10 years, however, my problem has been in the matter of room. At San Diego, California, during the months of February and March I had to practice removing several frames of honey from the brood-nest, and spread the brood in order to get the bees in condition for the coming honey flow. And in Hawaii, while at Wailuka, Island of Maui, it was the same. My bees there, as a rule, eight weeks be-

fore the algarroba flow, would have about what would make two good frames of brood. All the rest of the combs would be solid with honey. As I had no extractor, I replaced the combs of honey I removed with full sheets of foundation. By so doing I was able to have eight frames of brood when the algarroba flow commenced.

The result was that I got an average of 16 full-sized Langstroth frames, built from foundation, of algarroba honey per colony, during the seasons of 1921 and 1922; while my neighbors there, who kept bees and did not work them as I did, got no algarroba honey whatever during those years. As algarroba honey was the only honey gathered there that was fit for table use, it was extremely important that the bees be in condition for it.

Incidentally, I will also say that I expect to be confronted with a fresh problem here. We are 150 miles north of San Francisco, and I am informed that I can expect manzanita to bloom in February and madrona to bloom one month or so later. The manzanita bloom is said to contain a lot of nectar; the madrona, but little. Now, if any northern California beekeeper has any ideas to let loose, why, I am listening. Leslie Burr.

Willits, Calif.

[This is a good illustration of the difference in the management required in different localities. Much of the beekeeping literature is written from the viewpoint of conditions in the clover region of the northeastern portion of the United States where brood-rearing is carried on with such a rush in May that the honey-bound condition, so familiar to beekeepers in tropical and subtropical regions, seldom appears. This helps to explain why the southern beekeeper has but little use for beekeeping literature. Much of it does not fit his conditions at all. The northern beekeeper, accustomed to seeing solid frames of sealed honey disappear within a week and the combs filled with brood, sees no advantage in spreading the brood; while the tropical beekeeper, accustomed to more moderate brood-rearing, often finds it necessary if the colonies are built up to profitable strength.—Editor.]

WINTERING IN SOUTH DAKOTA

Packing Many Colonies Together in a Compact Group

I have wintered bees in a shed, like that shown in the cut, for five seasons, and now have them packed for the sixth. This method is so satisfactory and economical in time, labor and expense that I have lost all interest in discussions of the so-called "wintering problem."

I pack early, that is, during cool days of late September, putting in strong colonies first, allowing weaker ones to catch the light drift on the summer stands. When no bees are flying I find no appreciable amount of drifting occurs after moving when cool weather prevails.

Later, I add the other colonies, tiering up as many as four or five high. If a colony appears quite deficient in bees, I place it over a strong one, with only an inner cover between, having the hole in the center covered on both sides with wire cloth to prevent stinging through. For an entrance I open a small hole in front. This is kept corked in severe weather to conserve heat.

Hives packed on three sides, top and bottom. During cold weather the front is protected by a canvass curtain.

I have never had a case of robbing or fighting while the bees were packed. I do not doubt that the bees mix somewhat, but no bad effects seem to result. During sunshiny days the bees fly out in great numbers the whole length of the shed. In the cool of the day all retire peaceably to their houses.

In spring I move back about April 1, and protect the hives with windbreaks of covers, old bags, paper or whatever makes a good wind-excluder, as long as necessary. There is more drifting then than when moved in the fall. The strong colonies are moved first, leaving others in their places to catch the drift. About a week passes during the gradual removal, and no bees are lost. Thus the colonies are somewhat equalized. It is possible that an occasional queen may be lost as a result of catching drift too rapidly. However, one spring, before moving I left, till the last, one colony that consisted of a queen and about 100 bees. In a week it built up until it became one of the strongest colonies I had, and the queen survived.

I. W. Cameron.

Davis, S. D.

TINY EAST INDIAN HONEYBEE

Peculiar Habits of the Smallest of the Honey makers. Their Brood-rearing Cycle

I am at present stationed in Kohat, a small military station on the northwest frontier of India. I have not been here long enough to make a thorough investigation of the bee world but hope to glean information regarding the keeping of bees (probably *Apis indica*) by a hill tribe of Pathans, about 40 miles from here. These wild tribesmen keep their bees in logs, chattis (i. e. earthernware water vessels) and rough boxes, and sell in the bazaars of Kohat such small surplus as they may obtain. A colony of *Apis indica* has made its home in a tree near my bungalow, and busy little fellows they are. The giant bee of India is not present up here.

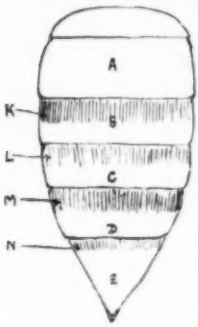


Fig. 1.—Arrangement of bands on the abdominal segments of *Apis florea*. Band A is orange-colored while bands B, C, D and E are blue black. The anterior portion of segments B, C, D and E is covered with snow-white hairs as indicated by the shading at K, L, M and N, the latter being narrower than the others. These bands of white hairs stand out prominently as white bands as shown in Fig. 2.

I have just had the good fortune to find a colony of *Apis florea*, the tiny East Indian honeybee. It may be of interest to your readers to have the result of my own study of these smallest of all bees.

The comb itself is built, in this case, on the lower limb of a small peach tree and is about one foot above the ground. It is in size slightly under six inches in depth by the same in width, "about the size of a man's hand." It is very delicate, the cell walls being exceedingly fine, about the thickness of cigarette paper. The cells do not tend to roundness but are hexagonal. My measurements, which I have been at some pains to check, make them eight to the inch horizontally and nine to the inch vertically as this comb lies. The cells are built about 80 to the square inch in worker comb. The top portion of the comb is drone comb.

Figure 3 was taken immediately after I found the colony. The enlargement of this (Figure 2) I certify to be the actual size of the comb in life and is sufficiently accurate for measurements to be made therefrom. The queen has laid eggs right out to the edge of the comb as the photo shows, and the whole comb is crammed with brood and eggs. I could find no surplus honey.

The workers are beautiful, as handsome as Italians. In length they average about ⅜ inch and are of slender body. The dorsal part of the abdomen shows the anterior third orange, the central portion banded alternately snowy-white and blue-black of about equal widths, the posterior third blue black with one fine white band.

I examined several specimens under the microscope and the white bands proved to be white hair, but they are very bright indeed throughout the whole colony. The actual segments show as in Figure 1. In some cases the segment B shows more orange than blue-black.

I found the queen after considerable search and much disturbing of the colony. Except for a black tip to her abdomen and faint blue-black-banded markings not very obvious, she is completely orange, but possibly of a more somber hue than the workers. In length

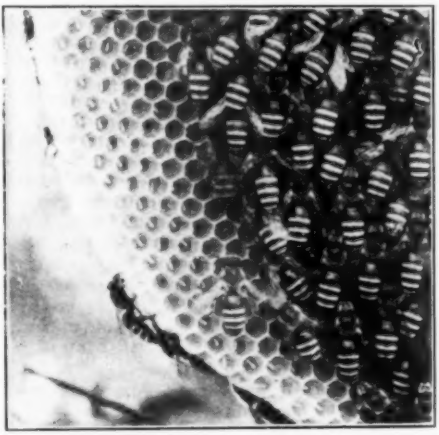


Fig. 2.—Portion of comb of *Apis florea* enlarged to exact size. Note the eggs in the tiny cells, also the white bands on the posterior segments of the bees.

about ⅝ inch, she resembles in shape any Italian queen.

There were several drones present. They are entirely black, shorter than the queen, with typical drone bodies except that they appeared to me to be out of proportion, the abdomen too short in comparison with the thorax. They may, or may not have recently emerged, but the thorax in every case is covered with white hairs.

Apis florea are extremely gentle and though much disturbed showed no sign of anger. They are very timid on the comb and huddled to one side when interfered with. I experimented with this colony by removing the queen, making

certain they had eggs and young brood, to see if they would start queen-cells.

On May 21 at 3 p. m., I found and removed the queen.

On May 23 at 8 a. m., six miniature queen-cells were started over young larvae. Each cell-cup was less than ¼ inch wide and about ¼ inch deep.

Fig. 3.—Recently established colony of *Apis florea*. Note that these little bees build only a single comb.

On May 25 at 8 a. m., two queen-cells were already capped over and eight others were in various stages of completion. Figure 4 was taken that day, and a good idea of the comparative sizes may be made between my finger nail and the queen-cells. The damage to the comb at the top left-hand side is due to the removal of a portion for measurements.

On May 27 at 3 p. m., four queen-cells were capped, each being about ½ inch long. They are smooth and not corrugated. All worker brood was capped. I received one sting which was barely perceptible.

On May 28 at 5 p. m., six cells were capped, and four more were as yet uncompleted. A small patch of worker brood had emerged, and, to my surprise I found eggs in several of these cells. These must have been from a laying worker as they were placed irregularly in the cells, on the cell walls and anywhere almost except the center of the bottom. I know no queen had emerged. The drone comb at the top was half full of clover honey.

On May 31 at 8 a. m., all ten cells were capped and considerable young brood had emerged. The patch of laying worker eggs had not increased.

On June 2 at 5:30 p. m., two queens had emerged, but the remaining eight cells remained capped and untouched. The colony was much more active.

On June 3 at 5:30 p. m., three queen-cells were torn down. Two others had been torn open and contained dead virgins. Three cells were untouched. The queen was not laying yet. Some cells of worker brood were being prepared for high cappings. All the worker brood had emerged.

On June 5 at 5 p. m., the remaining three queen-cells were torn down. I searched carefully and found one beautiful young orange-colored queen. She was not yet laying. The colony though much disturbed showed no vindictiveness but practically forsook the comb. A very few drones were present. They were, as reported above, entirely black with white hairs on the thorax.

Inspection duty took me to the Razmak field force on active service in Waziristan, and on my return, June 15, I visited my little colony to find that either disaster had overtaken it, as the comb lay deserted on the ground, or the queen and her little band had migrated to the hills, and a native cut down the comb.

As the temperature by day was about 110° in the shade it can be well imagined, that as soon as the honey flow closes, colonies in the open make for

Fig. 4.—Same as Fig. 3, but taken when queen-cells had been built and most of the brood had been sealed.

the cool of the hills and any subsequent flow of honey to be found. There is little doubt that bees in India, where they can do so, migrate from the plains to the hills when the hot weather approaches. I find that a colony of *Apis indica* which had been established under the branch of a larger tree has also disappeared.

R. H. Macdonald.

Bombay, India.

SIFTINGS

by J. E. Crane

Mr. Holtermann's experience in trying to get help to use a new style of uncapping knife reminds me of my own the past season in trying to get two helpers to use a new style of knife for cleaning sections. Neither wanted to use the new style of knife until after they had used it a day or two when they preferred it to the one they had been using. These incidents remind us that we should be slow in condemning new implements or methods until we have become thoroughly familiar with them.

* * *

The illustration at the bottom of page 31 is decidedly interesting. The house shows the plain life of the Swedish peasant. The hives are doubtless "straw skeps," while what appears to be a half opened umbrella is a straw overcoat to protect the hive from the weather, and made by tying one end of a bundle of long straw together, leaving the other loose to set over the hive. Some of the poorer Japanese peasants use such overcoats of straw to this day to protect themselves from the weather.

* * *

It has been a somewhat perplexing question when to put bees into the cellar this past fall. It has been so warm that we have preferred to leave them out rather than put them in a rather warm cellar. It has been a question as to whether they would consume more honey by leaving them out where it was a little too cold, or placing them in a cellar where it would be so warm as to make them restless.

* * *

J. L. Byer, on page 38, makes some statements on the differences in the honey trade in Ontario and New York State. He says that while wholesale prices, so far as he could learn, in almost every case are lower in the United States, the retail prices are 50 per cent higher. Now, here is a disinterested statement of immense importance, if what Mr. Byer found true in Buffalo is generally true throughout the country.

* * *

In looking over the report of the honey markets on page 5, I find only three reports where the retail price is over 35 cents for comb honey, which would seem to be a reasonable advance over the wholesale price; but these reports are almost all made by producers, so it would seem that the high retail prices are the prices of city dealers. It hardly seems possible that prices for honey could be twice as high in Buffalo as in Ontario, but we can not doubt Mr. Byer's word. May not this be an answer to the question as to why honey moves so slowly, and is not the question as to how to get our honey into the hands of consumers at the lowest price one of the most important questions for beekeepers today?

* * *

That is a capital idea of S. D. House of placing outside every garage a glass container partly filled with boiled honey and water, so that every man who drives a car can see for himself that a mixture of honey and water does not freeze, when mixed half and half.

* * *

My! But didn't my pulse beat stronger, and I begin to wish I was young again as I read that article on the "Great Progress of Recent Years," by Morley Pettit on page 12? The advances we have made are surely marvelous. This can only be realized by those who were trying to make a business of beekeeping 50 years ago.

* * *

On page 11 of January Gleanings the Editor gives some very interesting facts in regard to the cause of some honey being darker than other honey gathered from the same species of plants. I believe he is right so far as he goes, but the reasons given do not seem to cover the whole subject. Some years ago this subject was up, when, if I remember correctly, the kind of soil from which the honey was gathered made considerable difference in its color. One of the reasons for this belief was that sugar produced on light soils was of lighter color than that produced on heavy soils. There appears to be some other reason for dark honey. Many years ago, before there was much demand for extracted honey, I had a quantity that I wished to dispose of. I had some unfinished honey boxes, for it was before the day of sections. I thought it a capital idea to feed back this extracted honey and get my boxes finished. I did so, but great was my surprise to find the honey stored in the boxes much darker than that I had fed.

* * *

Sweet clover scores another point in being quite resistant to grasshoppers. See page 26.

FROM NORTH, EAST, WEST AND SOUTH

In Southern California.—Taken as a whole, conditions and crop prospects over southern California are not materially changed from our last report. In some localities rain has fallen in quantities sufficient to give the grass and shrubs a good start. But in only a few places has the rainfall reached the amount that fell prior to January 1, 1923, that being a season with a precipitation below normal. Most of us feel that it will take quite a rainfall, say, from 10 to 15 inches more, to assure us a crop on the sage ranges for the season of 1924.

The rainfall in the various years differs so materially that no one can foretell the outcome, but one old-timer says that away back in the eighties there was a year when we had no rainfall until January 27. After that there was enough so that there was a big crop of honey. We are surely a bunch of optimists out here.

Many beekeepers are feeding but with the question as to whether it is better to feed or to take chances on starvation. It seems to be only human to put off feeding until too late, with the hopes that the bees will gather enough nectar to get by. Under any circumstances, a season like this will see a heavy loss. Many are buying hard candy from a Los Angeles firm. This feed is proving to be quite satisfactory, as it is very easy to handle and it takes but little time to lift out a dry comb and set in the slab of feed.

The Riverside County Beekeepers' Club is getting quotations on making foundation and supplies in general, as well as feed for the bees. The feeling of good fellowship engendered by a good live club in any line is a wonderful help, and this is especially true with the beekeepers at this time. To tell your troubles to the other fellow and listen to his in return is good medicine for any of us.

Since my last letter I, as a committeeman from the Riverside County Associated Chambers of Commerce, visited the Palo Verde Valley on the banks of the Colorado River. While this valley is in our county, the speedometer registered 215 miles to the eastern limit of the county. From oranges to alfalfa and from mesquite to sage with hundreds of thousands of acres lying between—much of which would be capable of the highest state of cultivation and productiveness, should man provide the water for irrigation—is but a meager description of the country traveled over. The readers of Gleanings may tire of California's great pride in what has been, is being and will be done in making "millions of blades of grass grow where none grew before," as one speaker put it, but we seem to get the habit.

Los Angeles is looking toward the Colorado River for water, and a party of surveyors was taking elevations away out on the desert at the time of our trip. If the water should be brought across what is known as the Chuckawalla Valley, it would bring many thousands of acres under cultivation. This, like the Palo Verde Valley, would be a good place for bees. The Palo Verde, as well as the Imperial Valley which is also on the Colorado Desert, never fails to make honey. This last season was one of good crops. The farmers are again getting good prices for cotton and farm crops in general, and they feel that the hard rub following the war is pretty well over.

In a town grocery a few days ago I saw comb honey marked not less than ten ounces. Upon asking the price, I was informed that it was 27 cents per section, and that it was extra-good honey. It looks as if the production of comb honey would be a good bet for some years to come. L. L. Andrews.

Corona, Calif.

* * *

In Northern California.—The term "unusual weather," as applied in this state has been subjected to considerable abuse and ridicule for, according to our advertising agencies, any day that is not warm and sunny is classed as unusual weather for California. However, it may be very truthfully stated that we have been having very unusual weather. Not only has our section had less than half its normal amount of rainfall to date, but we have experienced likewise extreme weather with some new low temperature records in some localities. There need be no alarm, for some of the best seasons that we have had, have been those where heavy rains did not start till January or February. Our real old-timers will remember the season of 1883-84.

On December 27, 28 and 29 the California State Beekeepers' Association held its 34th annual convention at Sacramento. An excellent program was provided, and under the able leadership of President Cary W. Hartman much timely, instructive and excellent work was accomplished. Co-operation was very much in evidence; its significance was

keenly felt and one of the best addresses presented was one on "Co-operation," by Mrs. Dora Stuart of Chico. George H. Vansell of the University of California spoke on co-operation between the University of California and the beekeepers.

The subjects of advertising and marketing received their full share of attention, and during the ensuing year committees will be at work on these important branches of the industry. Another important function of the Association will be its endeavor to secure better bee-disease legislation. This subject is of vital importance to all and, if we are to achieve results in this direction, our Association must receive a solid backing from all beekeepers. The officers for 1924 have pledged themselves to get results, and the rank and file must co-operate.

The officers are: President, Cary W. Hartman, Harrison Blvd. at Grand Ave., Oakland; first vice-president, Casper Hauser, Sacramento; second vice-president, M. H. Mendleson, Ventura; secretary, J. T. Howard, Foothill Blvd., Oakland; executive committee, Willis Lynch, Stockton; M. C. Richter, Big Sur; W. J. Oates, Lompoc. T. O. Andrews of Corona and J. E. Pleasants of Orange were elected honorary presidents.

A drive for increased membership has been started, and it is a pleasure to state that in an astonishingly short time many new memberships have been received. A number of the members at the meeting pledged themselves to secure five new members and, in less than the time that it takes to write it, nearly $100.00 was paid into the treasury.

A fully representative body with large membership is an important factor in securing the best possible results. The membership dues are only $1.00, and the secretary is ever ready to enroll any beekeeper. It is the intention of the Association to send out monthly circular letters setting forth the activities of the organization. M. C. Richter.

Big Sur, Calif.

* * *

In Iowa. Our bees went into the cellar about Dec. 15. It has been a question ever since as to whether it might not have been just as well to have left them out; but tonight (Dec. 31) there is no question as to where they should be. Farmers were plowing up to the day before Christmas; but, from now on, Iowa weather is an uncertainty, and we much prefer our bees in the cellar than out.

The outside-wintered bees, in my opinion, will suffer for want of stores before spring if the beekeeper has not taken the precaution and fed them this fall. While there may have been some favored localities where the fall honey flow was sufficient to enable the bees to gather enough for winter, it is by no means a general condition in Iowa. My conclusions are drawn from letters received from beekeepers in different parts of the state. Seventy-five per cent of my bees would have starved before this had I not fed them. In my opinion, the farmer beekeepers with only a few colonies getting the usual care such bees get, will not be bothered with swarms next summer and will not need any new supplies.

Honey has been moving better of late. While there has been no mad rush, the demand has been steady all winter for moderately priced honey. When I see the prices some are getting I wonder how they can get it. One dollar and twenty-five cents per 5-pound pail in these parts would mean mighty few honey sales. Localities differ very materially. Some localities are populated with honey eaters, and will pay any reasonable price for it. Others will buy if it is cheap enough, say, around the price of sugar. Many will buy the cheap glucose syrups and kid themselves that it takes the place of honey. Wow! How any father can say that he loves his family and bring that dope home for them to eat is beyond me.

That people are using substitutes for honey more than ever is a lamentable fact. There is at least one good reason why this is so. If you will take the trouble to look it up, you will find that a lot of glucose propaganda (the scientific name for it is corn products, corn syrup and such) is being placed in the domestic science departments of our high schools, especially in the smaller schools. I am not guessing at this, I have seen it there, and know. You don't find anything about the food value of honey there though. Those people have beaten us to it. I subscribed a few dollars to an Indiana man some years ago for this very purpose, but nothing ever came of it that I have heard of. This is too bad, because it is a worthy cause, and, if we do not wake up, the corn syrup, the domino honey syrup and some other kinds of syrups, that are having so large a sale, are going to put honey off the map, and we will all have to go into the mixing business to get rid of our honey. Some people will buy a mixture any time in place of the pure article, and pay almost as much, thinking they are getting it cheap.

P. T. Barnum said the American people like to be humbugged, and I half believe he was correct. If we allow this glucose propaganda to continue without holding up honey before our high school pupils as one of the most wholesome sweets, it will not be many years until

the honey business will be on the rocks. "Train up a child in the way he should go, and when he is old he will not depart from it." W. S. Pangburn.

Center Junction, Iowa.

* * *

In North Carolina.—With the people of this state shivering under the stress of the severest cold wave experienced since the winter of 1919, it would seem an unpropitious time to write about the "Bees and Honey" interests hereabouts; but the call comes from "Gleanings" for an "In North Carolina" story, so here goes.

The indications are that bees in this state are up against the necessity of enduring about the hardest winter conditions in many years. Packing and winter protection are very little practiced, especially in the larger beeyards, owing to the exceptionally mild winters in recent years. Actual losses of colonies and serious retarding in spring development of many others are certain to characterize conditions generally when the "spring counts" come to be made.

The fact that the past season was about the best on record in this state in the matter of honey production would warrant the assumption that, as a general thing, bees went into winter quarters with about the maximum of stores except in case of some too greedy beekeepers who failed to leave sufficient honey when the "surplus" was taken. In many parts of the state it has become the practice to take no part of the fall honey flow from the bees, but to leave this for winter.

However, there are sections of the state where the fall honey flows generally warrant the taking of considerable surplus honey, notably in the what may be termed the middle eastern and northeastern coastal sections of the state, which seem to be favored not only with heavy spring honey flows, but with fall honey flows that enable the bees to go into the supers, even finishing comb honey sections in a very satisfactory manner. From the Pamlico River section, Washington and Terra Cea sections, come reports of heavy fall crops the past season. One large apiary in that region is reported to have some five thousand pounds of fall honey still not extracted.

One good result of the severe weather, that seems to harbinger a good spring honey flow, is that honey plants are being set back by the cold, which should lessen any danger of the early budding that would make frost damage more likely. This danger of frost damage especially characterizes the first half of April, and if vegetation is not far enough advanced at that time to be injured by frost, the danger of injury is usually past.

Right now beekeepers are standing pat and hoping that all their colonies have stores sufficient to pull them through. That is about all they can do, as it would be next to impossible to give any aid worth while to a starving colony during severe cold. Ordinarily there is rarely ever a week during the winter that bees do not fly, or during which, if an emergency required, a hive could not be opened.

The task for beekeepers just now is ordering supplies and making them up in readiness for the April, May and June rush when there is but little time for such work. W. J. Martin.

Wilmington, N. C.

* * *

In Arkansas.—Our bees are in excellent condition, abundantly supplied with young bees and stores of a good quality. In November I went through an out-apiary of mine consisting of 40 colonies, which I quite expected to feed; but to my surprise each colony had from two to three standard hive-bodies of honey and bees in addition to about 100 pounds of good honey in shallow supers. When I had finished my work I went up town to tell some of my customers, who had begged for honey which I could not supply, that I now could let them have a little. To my surprise a beekeeper friend whom I had induced to change his "box gums" to movable-frame hives, had several 10-pound pails of beautiful comb honey for sale which he readily sold at a good price. He expressed his appreciation for what I had done for him, and stated that he secured five shallow supers of white comb honey per colony that he would not have secured from his box gums.

Among the problems we have here are black bees, box gums and lack of knowledge regarding bees and equipment. Foul brood has never been in this section of the state. Of course, we can not appreciate this blessing as do those who have had it. Beginning on page 712, November, 1923, Gleanings reports a great step forward. All who are responsible for this discovery and experiment should be remembered for years to come. We certainly are in a wonderful age.

In the South we produce big colonies of bees long before our honey flow is on. In the North the honey flow is on before the colony is ready for it. If we could let the northern beekeeper have our surplus bees, he could build up much faster and be amply prepared for his honey flow, this being a benefit to both of us.

Elba, Ark. J. V. Ormond.

In Michigan.—Northern Michigan, along with most other northern states, enjoyed a very mild late fall and early winter; which brings out the usual statements in the form of predictions that, as a result, great quantities of stores will have been consumed and that bees will starve before spring. The facts are, however, that the mild weather, provided it is not too warm and does not cause the bees to break cluster and fly out, is a saver of the stores.

We have had very few, if any, temperatures that would penetrate the packed colonies out of doors, and certainly none to raise the cellar readings that were above the clustering temperature, so no brood-rearing would be started. I question if there was a day in this vicinity that bees took a real flight after the 20th of November, and there were very few flight days during November. October was beautiful but not warm enough to induce the bees to fly to any great extent.

The shortage of stores is rather due to the scarcity of fall nectar, and, unless bees were fed late, they were light when put away for winter.

In the middle of December I visited my cellar containing 200 colonies. It was absolutely quiet and the temperature stood slightly below 50 degrees Fahr. Except for the slight shortage of young bees as a result of light fall secretion of nectar, bees should winter normally.

Honey has not been consumed thus far to the extent of late former years. The price asked has varied considerably. The tendency seems to be to ask less near home than in an adjoining territory on the account of less expense in getting it to market. This naturally brings about an unhealthy condition in the market and brings about competition based almost entirely on price, which eventually would ruin the industry.

One beekeeper believes he should sell cheaper at home than away. Another who believes and practices the same thing, having more than he can sell at home, goes into the distant market at an expense of several cents per pound, but finds to his dismay that honey is perhaps cheaper there than at his home town, and so, in order to unload, he is liable to sell at even less than his home market would pay.

This has its effect upon the market which is usually depressing; and consumers, finding prices going down rather than up, are in no hurry to buy. There is nothing like a stable price that is fair to all concerned, and then let us try to get our own particular honey on the market by unusual service, neater packages, better quality if possible, and salesmanship worthy of the name. If there was any necessity for the beekeeper to force his honey on the market it might seem different but there is coming a great and growing market and, with the paved trunk lines and improved crossroads leading to every village in the states, wonderful marketing advantages are open to those who would dispose of their own products.

Ira D. Bartlett.

East Jordan, Mich.

* * *

In New York—The most important beekeeping activity for New York during the early winter months is the matter of holding and attending conventions. It is surprising how few make a practice of attending even one of the several meetings held during the winter, while the summer meetings occurring during the busy season are attended by nearly five times as many. This may be explained partially from the fact that the summer meetings are devoted to reports on crops and a discussion of probable prices, while the winter meetings are devoted to general beekeeping and production problems, indicating that more are interested in the matter of marketing than in production.

At the recent meeting of the Western New York Honey Producers' Association a proposal was made that the association establish a sort of speakers' bureau to offer men to speak at clubs and other functions on bees and honey, especially honey the commodity—in other words, to spread the gospel of honey. About a dozen volunteered their services for this work, and it is planned for these to get together some time in the future to complete their plans.

The honey market demand and prices are about the same as they have been for the past two years. With our extra-big crop here, the present demand will not nearly take the crop before the arrival of the 1924 crop. Members, as a rule, have held steady to association prices. The smaller producers have been able to clean up at fair prices; while some with heavier holdings feel that the price has been held too high, that at a somewhat lower retail price there would have been demand enough to have taken the entire crop and that, when bottlers are offering only around 9 to 10 cents per pound for white honey, $1.25 for the 5-pound pail is too high for the consumer.

Weather here has been exceptionally fine this fall. Bees have been flying freely until a few days ago (this is January 1st), and the condition of clover for next season is all that could be asked. Bees were in good condition and heavy early in the fall, but have used heavily their stores during the warm weather. At

several of our outyards we had one or two more colonies than we had winter cases for. These were left to be drawn home and put into the cellar, but we neglected to do so until the day before Christmas when we were much surprised to find them quite light, although they were very heavy in October.

Sometimes when there is considerable winter loss it is quite a problem to get the combs containing dead bees cleaned up. When these combs are given to the bees they will sometimes gnaw the entire sector of the comb away instead of pulling out the dead bees. One of our friends has solved this problem by hanging the frames loosely in a building infested with mice. The mice will pull out the dead bees without injuring the combs if the combs are hung far enough apart. This works out finely. It was devised by the man who discovered honey as an antifreeze for automobile radiators.

Ransomville, N. Y. H. M. Myers.

* * *

In Oregon.—The fourth annual meeting of the Oregon State Beekeepers' Association was held at Hermiston on December 11 and 12. The meeting was attended by about 60 beekeepers, among whom were some six or eight representatives from the beekeeping sections of Washington. The meeting was one of the most successful which the Association has held since its organization four years ago. The two most outstanding features of the meeting were: first, the formation of a joint committee from Washington and Oregon to study the marketing problems; and second, a report of bee-club work in the state.

Considerable attention was given to disease control, and a conference of county bee inspectors was held in connection with the Association meeting. It is hoped to make this conference a permanent feature of the annual meeting.

Officers elected for the coming year were: President, J. B. Skovbo, Hermiston, Ore.; vice-president, A. J. Sanford, Redmond, Ore.; H. A. Scullen, secretary-treasurer, Corvallis, Ore.

Up to December 30, the winter was one of the mildest and driest which this section has known for some time, and bees seemed to be wintering in fine shape. However, on the 31st there was a decided change in weather conditions followed by extreme cold, and at the present writing (January 2), the temperature is hovering close to zero with some six inches of snow on the ground.

Honey seems to be moving well on the market, and there is no apparent change in price. H. A. Scullen.

Corvallis, Ore.

In Minnesota.—On account of the soil here containing an abundance of lime, this is a first-class clover section, especially as regards its nectar-bearing qualities. In early spring there is a variety of willow that is a wonderful pollen-producer. This is when I use my Boardman feeders. I have found five and six full frames of brood within 15 days after placing the bees on their summer stands. The willow is soon followed by dandelion, which always produces nectar here. I often get half a super of surplus from dandelion. I never offer it for sale, but whenever there is a good opportunity I feed it back. Then come the wild tree fruits, pin cherry, choke cherry, plum and others. These furnish all that is needed for brood-rearing until white and alsike clover begin.

Before they are half through, the sweet clover is beginning and does not let up until frost kills it. It is the king of honey plants here for quantity. It will be hanging full of bees when the white and alsike clover are nectarless on account of cloudy days and very heavy dews. There is an abundance of Canada thistle, which produces a very fine-flavored honey.

The wild raspberry is here in profusion and also produces a fine-quality nectar. There is considerable basswood but it does poorly here. We get nectar about one year in three. There is an oversupply here of perennial sow thistle. Some beekeepers here maintain that it is a good honey plant, but I am doubtful. I have never seen the bees working on it to any great extent and am inclined to think it is pollen they are after. There are several fine fall nectar yielders, among which is fireweed, also a variety of wild sunflower; and about each alternate year there is a profusion of nectar in the goldenrod and aster. In fact, from about April 15 until September 1 there is never a nice nectar-producing day that there is not some plant producing it.

We who produced comb honey have the same trouble with swarming as other localities—perhaps more.

But every locality must have some drawback and ours is wintering. Bees that do not get a flight for five months must have all conditions almost perfect or many will not get through, and it is a well-known fact that there is nearly always some condition rising to prevent perfection. The average winter loss here is about 33⅓ per cent. I think I could reduce this percentage somewhat if I wintered here, but I do not. I shut the bees up in the bee cave about December 1 and get back about April 1. This is a delightful climate in summer, but I prefer wintering farther south.

Malung, Minn. M. R. Thompson.

In Ontario. If asked whether we might expect to find brood in colonies in the month of December here in Ontario, probably the most of us would say that none was likely to be found at that season of the year. At least that is the answer I would have made to such a question if asked me previously to December, 1923.

About the 20th of the month we brought in from several yards around home here a few colonies mildly affected with American foul brood found late in the season. While I say they were "mildly" affected, yet there was too much disease present to make us think of carrying the colonies through the winter. Especially if such colonies have to be fed, two or three cells of American foul brood are enough to condemn them.

The bees were brought home and placed in the wax room, that is built in one corner of the basement under the extracting house. The room was well heated and when we took the covers and quilts off the hives, we fully expected that the most of the bees would fly to the windows so that we could easily destroy them. We waited a few days, but very few would stay on the windows. They persisted in coming back to the nearest hives at night. At any rate, only a small percentage of the bees could be made to leave the combs, so we had to shake the bees off as best we could in order to get the combs ready for treating later with the alcohol-formalin solution.

The bees were shaken into a large galvanized washtub, with an inch or more of kerosene in the bottom, which meant instant death to them. We could not use much smoke, for that would be worse than stings in a close room, and you can imagine the nice time we had in clearing the bees from over a dozen strong colonies. But that is another story. I merely wanted to tell that, much to our surprise, we found colonies with brood in four combs in all stages of development. The brood circles averaged from four to six inches in diameter. I hope that was not the general condition of all our bees, with the cold weather following.

These colonies had not been fed up for winter, and as a consequence they had a large amount of empty comb in the brood-nest, and I think that was a factor in causing them to breed in December. A friend writes that, since these bees had not been packed and were thus exposed to more weather changes in the mild December we had, this would probably cause more uneasiness and consequent brood-rearing. While I am not sure as to the cause, I certainly am sure that the brood was there, and I can only hope that this condition was not general, for it certainly is not a desirable thing to find in late December.

A good friend in the United States has sent me a bulletin issued from Washington, D. C., in which the average yields and other data relating to colony condition are given for the years 1922 and 1923. Naturally we are apt to associate balmy climates and tropical conditions with big honey yields, but a glance over this bulletin dispels any such illusion. While the average yield given for the United States for the past season is 39.1 pounds and many of the southern states show a much lighter yield, North Dakota heads the list with an average of 136 pounds for 1923 and 157 for 1922. I suppose that sweet clover is largely responsible for this showing, and there is no question but that this applies to some of the other states in the northwest as well as our own western provinces.

The convention at Toronto was well attended, and interest was well maintained throughout all the sessions during the three days. While I am not sure as to the number registered at the convention, I was reliably informed that more than 500 were present at some of the sessions. While the interest was good on every topic brought up for discussion, the alcohol-formalin treatment was about as live an issue as any considered.

While I may be treading on delicate ground, I am going to take a chance of being rebuked and give my ideas on this question as I see it. Considering the future distribution of this article, if it proves as good as it now looks after the trials given it the past season, I feel that Dr. Hutzelman is deserving of recognition in some tangible form from the beekeepers of the United States and Canada. If his discovery proves to be what we fully expect it will, and if it were possible for him to supply all beekeepers with the solution at a reasonable price, perhaps he could be recompensed in that way. But that is impossible—it is altogether too big a thing to be handled in that way, especially in view of the fact that the formula was published and is known to many. Even if it had not been given to the public, chemists say that it is extremely easy to analyze. Indeed, people were at the Toronto convention with samples of the solution, accompanied by a certificate of analysis from one of our well-known universities. So I repeat, to me it seems that it would be a fine thing if Dr. Hutzelman could be recognized in some way either by the state or the people. If done by the latter, I for one, would gladly do my bit if opportunity presents itself and we find that this discovery is the boon that it seems destined to be in the next few years.

Markham, Ont. J. L. Byer.

[See also page 88.—Editor.]

HEADS OF GRAIN FROM DIFFERENT FIELDS

How Recipes Will Sell Honey. A man living near Palestine, Illinois, has several colonies of bees. His wife, who is a good cook, experimented with honey in cooking and baking. One day they advertised a public demonstration. This was given in a local grocery store. Samples of food, sweetened with honey, and the recipes were given to the public, and were kept on hand for distribution with sales by this groceryman, who had the exclusive sale of this brand. Carrie T. Urban.

Washington, Ill.

Prospects in Argentine Republic. The honey season has just started here (November 9) after a rather too rainy early spring. We depend principally on rape, which is called nabo in this country, and also a good deal on alfalfa and thistles. There is plenty of yellow clover, but it does not seem to yield much honey. In another bee garden (not apiary, which is a horrible word, about as English as Yokohama or sauerkraut), which we installed 20 leagues from here in the forest, we got excellent and abundant honey from trees like the espinillo and algarroba. We get some honey, but quite inferior and dark, from a sort of palm. While I am writing a huge swarm of locusts has settled here, and—good-bye, alfalfa!

W. S. Deschamps.

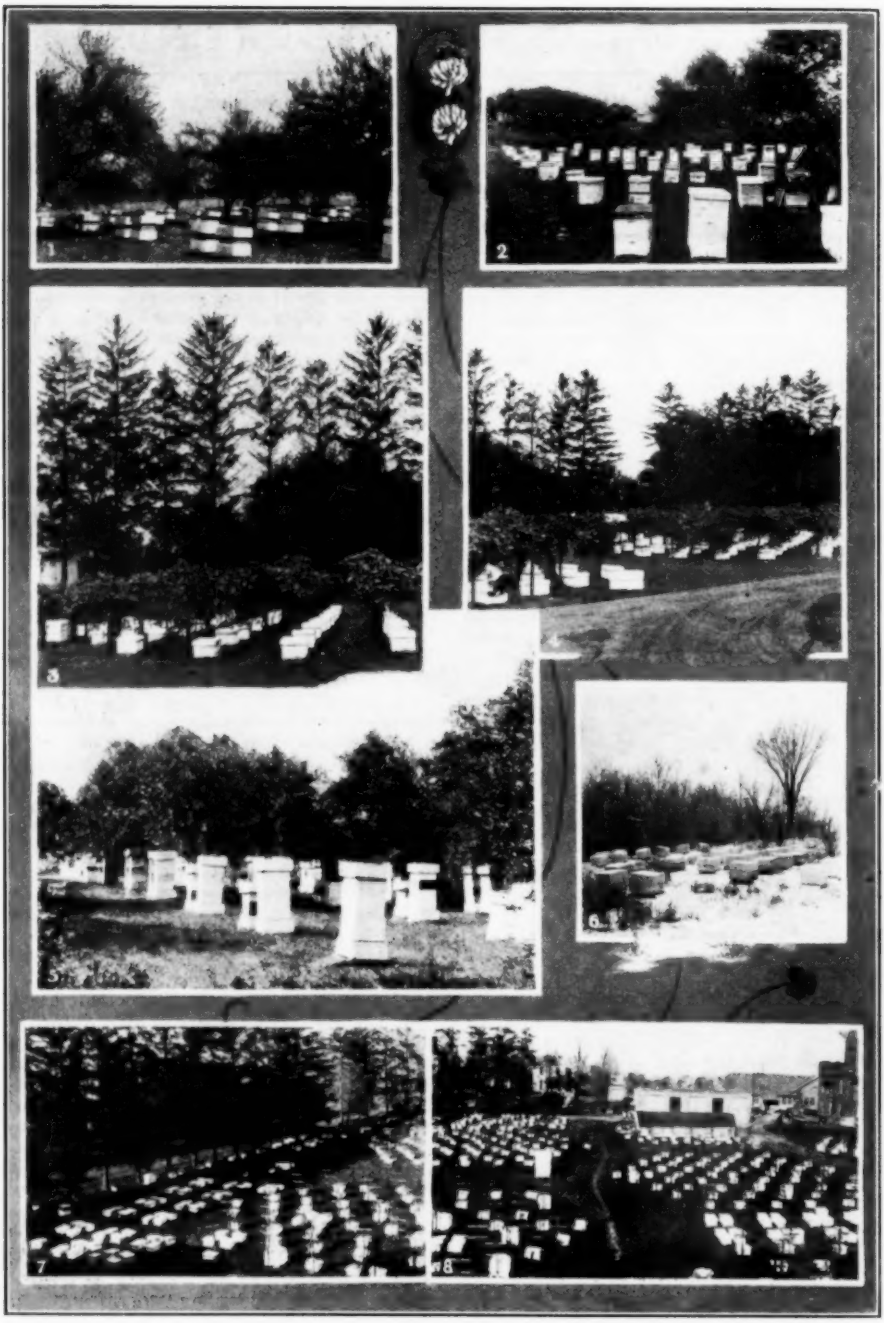
Racedo, Argentine Republic.

Long Season in Arizona. We ship out about 35 carloads of honey annually from middle Arizona. My bees are flying today (Christmas day). Although we have had a light frost some bloom still remains and young queens are still laying. Buckbrush begins furnishing some pollen and honey by January 15. Cottonwood will be in full bloom February 1 to 5, although it furnishes no honey. Arizona loses more bees during cottonwood bloom than in all the rest of the year since great activity in brood-rearing uses up stores very rapidly and many neglect to watch and feed before the willow bloom. If there is no desert bloom another dearth occurs after the willow before the mesquite and alfalfa bloom. Cotton usually yields pollen and honey to December 1, leaving our bees without incoming pollen or honey for five weeks. We have had plenty of rain the past month and the desert is green. If we get a few showers during the spring, which is our rainy season, the many millions of acres of desert will be a sea of grass and flowers, which stimulates brood-rearing and a great swarming fever. Big hives or spreading brood does not stop it. Small desert flowers yield heavily in both pollen and honey, and when in bloom I find my bees working three miles from home. I have had to run the extractor almost continuously from April 25 to November 1 some years. The mercury usually runs to 100 or 115 degrees from June 15 to August 15, yet I seldom lose a comb in extracting. We have no sleet nor snow. Our hives sit on the ground the year round with all the supers on, and we are not particular whether we have a large or small entrance. B. H. Hadsell.

Buckeye, Arizona.

Discarding Imperfect Brood-combs. The great loss incurred from allowing imperfect brood-combs to remain even one season in the brood-chamber amounts to many times the cost of replacing them. It certainly seems poor policy to leave a frame of comb for a queen to lay in, or for any other purpose, with stretched cells under the top-bar and perhaps lacking considerable from being built down to the bottom-bar, as the enlarged cells under the top-bar and space not filled with comb would mean a great number of cells not available for the queen. The space left from combs not being built down to the bottom-bar is often filled in at the corners with drone-comb, which is a nuisance both from resulting drones and the drone brood projecting out much farther than worker brood, requiring more space to lift out the frames, or if interchanged, preventing the combs from being properly spaced unless the brood is shaved down. At the present time there is every encouragement for the beekeeper to weed out the poor combs, as the brood foundation now being manufactured makes a complete and perfect comb if given to a colony of proper strength when nectar is being gathered. A good time to remove poor combs is whenever one is found. Comb containing brood can be placed in the super over an excluder on colonies run for extracted honey. A. C. Gilbert.

East Avon, N. Y.



SOME OF THE A. I. ROOT COMPANY'S BEEYARDS.

No. 1—Crouse yard in May, with one super on. No. 5—Crouse yard in August after the crop was gathered, but before it was taken off. No. 2—The York yard, with natural windbreaks on the north. Nos. 3 and 4—Home yard in summer, with grapevines in leaf. Nos. 7 and 8—Home yard in late fall, showing on the left colonies brought in from a couple of the outyards to be put into the cellar. No. 6—Maytham yard and its natural windbreak on the north.

GLEANED BY ASKING

Geo. S. Demuth

Honey Soured During Winter.

Question.—What could cause sealed honey to sour in the hives during the winter? This occurred in unprotected hives.

Michigan. W. E. Sebastian.

Answer.—The souring or fermenting is brought about by the honey absorbing moisture from the air until it is thin enough for fermentation to take place. The usual cause for so much moisture within the hive during the winter is either a lack of protection or the presence of poor winter stores, which causes the bees to become unduly active and thus give off large amounts of moisture. This trouble can be prevented by proper protection and making sure that the bees have good winter stores, such as a good grade of white clover honey or sugar syrup.

Dragging Out Dead Bees in Winter.

Question.—My strongest colony drags out about 100 dead bees in a day. Is this anything serious? Cecil Chambers.

Ohio.

Answer.—While 100 bees per day is an unusual number to die even in a strong colony, this is probably not at all serious, for such a death rate may last only for a short time until the older bees have died off. If a colony is strong in young bees, the loss of these old bees will not prevent good wintering. Such a death rate may be entirely normal in colonies having a large number of old bees, while in colonies made up chiefly of young bees only a few die during the winter.

Carniolans Compared with Italians.

Question.—With such a short season for building up in the spring as we have here, together with the usual dearth of nectar between fruit bloom and clover, would Carniolans give better results than Italians?

British Columbia. C. F. Pearcey.

Answer.—Since Carniolans keep up brood-rearing under adverse conditions more than do Italians, there are locations where the Carniolans will build up to greater strength. In the heavy brood-rearing period of spring there would probably not be much difference between the two races in breeding, but after the period of heavy brood-rearing Italian bees usually reduce their brood. In localities where the main honey flow comes early in the season, these two races will probably breed up to the same strength previous to the honey flow, but if there is a later honey flow Italians are not so well prepared for it as are Carniolans. Carniolans are, therefore, especially adapted to localities where the main honey flow comes late in the season, or where there is a succession of honey flows with intervals of dearth between. In other localities their inclination to breed out of season is a decided disadvantage.

Honey Becomes Cloudy on Melting.

Question.—What are the cause and the remedy when perfectly white honey that has granulated becomes cloudy or translucent on melting? W. E. Reim.

Wisconsin.

Answer.—The cloudy or translucent appearance of the honey is no doubt caused by fine crystals that were not completely dissolved when the honey was heated. It will be necessary to keep the honey hot for a longer period or raise it to a high temperature. Care should be taken not to heat it above 160 degrees.

Dull Humming in Cellar.

Question.—Is it all right for the bees to continue a dull humming after putting them into the cellar? The temperature of the cellar is about 45 degrees Fahrenheit.

New York. H. J. Mahring.

Answer.—Even with the most perfect wintering there will be a dull humming that can be distinctly heard when entering a cellar where many colonies are stored. This is sometimes described as a "low, contented hum," and is quite normal. By a little experience one can tell by the noise the bees are making whether they are wintering well or not. The quieter they are the better they are wintering, as a rule.

Bees Use More Stores in Mild Weather.

Question.—The weather here has been very mild and the bees have been flying every day. Will they consume much more under these conditions than in cold weather? A. J. Young.

Montana.

Answer.—Whenever bees fly freely they consume more stores than if they remain quietly within the hive, and no doubt more stores have been consumed in general during the mild fall and early winter than would have been the case if the weather had been slightly colder. However, the fact that the bees stay within their hives during cold weather does not mean that they are quieter than during mild weather. The bees within the winter cluster are sometimes more active, and therefore wear themselves out faster and consume more stores during cold weather than they do when they have a frequent flight on account of mild weather. Bees have a strong instinct to conserve their energy to the greatest possible degree during the winter period and when the weather is mild so that they are not compelled to generate heat to keep up the temperature within the hive. They simply relax and become quiet, unless in need of a cleansing flight or the outside temperature goes high enough to

tempt them out. Bees that are wintering well in the cellar where the temperature may be considered "mild" consume less honey than those wintered outside where they must generate heat to keep up the temperature during cold spells. Throughout much of the country the fall and early winter temperatures have been somewhat comparable to cellar temperatures and, except in those locations where the bees have been tempted out for flight frequently, the amount of stores consumed should be actually less than when the weather is cold. In the case of frequent flights, however, they have probably consumed more than usual.

Bees Restless in Cellar.

Question.—The bees are very restless in my new cellar, which is partitioned off in one corner of the basement where there is a pipeless furnace. The temperature runs between 40 and 50 degrees, but has not gone above 50 in the bee room. Can you suggest anything I can do to help matters?

Minnesota. C. E. Boddy.

Answer.—If all other conditions are right, the bees should not become restless at temperatures up to 50 degrees or even a few degrees higher. This is especially true during the fore part of winter when it is less difficult to keep the bees quiet. Possibly the honey the bees are using contains more than the usual amount of indigestible matter which has accumulated in their intestines causing them to be restless, but the more probable reason in this case is that the air in the cellar is too dry for the comfort of the bees. In most bee cellars there is too much moisture, but the furnace would tend to dry the air within this cellar. By sprinkling a little water on the floor of the bee cellar, or giving the bees water in jelly-glass covers shoved into the entrances or in a sponge or cloth saturated with water, it can be easily determined whether the restlessness is brought about by the atmosphere being too dry. If this does not cause the bees to quiet down, it will be necessary to reduce the temperature.

Moving Bees Short Distances.

Question.—I want to move my bees about 100 feet. It will be impossible to move them a little at a time. When will be the best time between this and spring to do it?

Indiana. H. D. Williams.

Answer.—The best time to do this in your location will be during January or February. Usually the bees are confined to their hives during these months, so that on the first flight day they will note their surroundings and thus re-orient themselves. If they should fly freely just before being moved, then again shortly afterwards, it will be a good plan to lean a narrow board in front of the hive in order to cause the bees to note their changed surroundings. When bees have been confined to their hives for some time during the winter most of them will return to their new location after their first flight after having been moved. If these bees had been put into the cellar in November, then put on their new stand the latter part of March, there would be no loss from bees returning to their old location.

Feeding Bees in Midwinter.

Question.—Should colonies of bees that are short of stores be given frames of sealed honey in midwinter or is this too late to disturb them? A. C. Gross.

Pennsylvania.

Answer.—Combs of sealed honey can be given to the bees even in midwinter when this is necessary. It will be best to do this on a mild day, and unless it is quite warm the frame of honey should be laid in a horizontal position on top of the frames immediately over the cluster. The comb of honey should then be carefully covered with a piece of canvas or old carpet and the packing replaced above.

Removing Larvae Dead from American Foul Brood.

Question.—Do bees ever tear down larvae dead from American foul brood before it is fully discolored or sticky? If not, do they ever tear them down or partly down before the scale is formed? Chas. Hartman.

California.

Answer.—Since in American foul brood the larvae die at about the time the cells are capped, the bees apparently do not discover that anything is wrong until the gases from the decaying larvae cause the cappings to become discolored. They then often open the cell, thus bringing about the characteristic perforation in the capping. At this time the decaying mass is already adhering to the cell. Under some conditions some of the larvae die before they are sealed. In such cases, no doubt the bees are able to remove the dead larvae entirely before they become sticky and adhere to the cell wall. As a rule, the bees do not tear away portions of the dead larvae before the scale is formed, but they do gnaw at the scale and sometimes flatten it down somewhat.

To Prevent Left-over Syrup from Souring.

Question.—Is there any danger of sugar syrup made of two parts of sugar to one part of water left over from fall feeding souring before it can be fed to the bees in the spring? R. S. Vasdorff.

Ontario, Can.

Answer.—Souring can be prevented by heating the syrup, then putting it into 60-pound honey cans and sealing the can tightly. Heating destroys the ferments that may be in the syrup; and sealing prevents the entrance of ferments from the atmosphere, and also prevents the absorption of more moisture, which would increase the tendency to ferment.

BEES, MEN AND THINGS
(You may find it here)

"More honey should be sold direct to the real purchasing agents of the American homes, the housewives, as is being done in the case of coffee and tea wagons. When I use the word "sell" I really mean sell honey so strong that it will be a regular article of food in the American homes."—J. V. Ormond, Elba, Ark.

"I have used honey as an anti-freezing solution for automobile radiators in various ways during the past two seasons and find it very satisfactory. It is cheaper through the course of the winter than alcohol and does not have its heating tendency. If this works out as I believe it will, the consumption of honey will be increased greatly."—Chester N. Ballard, Schuyler County, N. Y.

"Artificial flowers sealed in a glass jar and placed outside the window add a bit of color that is very pleasing and suggestive of the hoped-for springtime with all the beauties of nature that spring and summer bring to us. Last winter when my canned bouquet was partly covered with snow my friends would exclaim: "Oh, what lovely roses! but aren't you afraid they will freeze out there?"—Clarence B. Jackson, Chelan County, Wash.

"Last fall I put out a jar of feed for the bees every day and if I did not put the jar out in the same place at just such a time, about a dozen bees would come to my kitchen window, then meet me at the door as I went out."—Miss Mary E. Lincoln, Barnstable County, Mass.

"Bees are breeding up very slowly. The few colonies I have examined show a little eucalyptus honey that is now coming in. The rain in this county has been exceedingly light, and the north winds following have taken all of the little moisture we have had. Consequently, the rains have done no good whatever. The losses of bees in this section will be great."—M. H. Mendleson, Ventura County, Calif.

"My hives are full of honey for winter and are well packed in tarred paper cases with four inches of packing at the sides, two inches on the bottom, and six to eight inches on top. Very few individual bees have died thus far. I am expecting a bumper crop next season."—Perry L. Henry, Summit County, Ohio.

"I live in the heart of Dallas, Texas, and have some large oak trees in my yard. In one of these there is a cavity in which a swarm of bees found its home about seven years ago. From this colony a swarm came forth soon after, and I now have forty colonies of bees, which this year made about a ton of honey mostly from cotton blossoms in and around this city. In the tree above the colony of bees a mocking bird built its nest and the male bird made music for us all summer, sometimes singing a goodly portion of the night. Some mischievous boys wanted to rob the mocking birds of their nest and I told them to go to it, but on their way up they encountered the bees and made a hasty retreat."—John R. Hancock, Dallas County, Texas.

"Goldenrod is our main honey-producing plant in this section. It also produces our best quality of honey. During a good honey flow it is light amber in color, and I think it will compare favorably in quality with other light grades of honey. The honey flow from this source begins about the first of September and lasts until the end of the month. Good colonies store an average of about 100 pounds each when run for extracted honey. The honey is very thick and heavy so that it is some trouble to extract it on account of the weather being quite cool at the time of extracting. This honey granulates soon after extracting. It also granulates in the combs when left in the brood-chamber during winter. We have very little trouble in wintering bees on this honey, and I never worry as to how they will come through the winter when the hives are heavy."—E. G. Kyte, Cameron County, Penn.

"I wish some expert queen-raiser would try adding some royal jelly to the food of drone larvae, experimenting to find how much a drone larva can stand, thus if possible rearing some drones that have been primed with royal jelly and see if they differ from normally reared drones. I have a theory that the bees may control the prepotency of the drones as they control the raising of queens, that is, that they may feed a few drones the more stimulating food and that these drones are the ones that are able to outfly their rivals and mate with the queen. If this is true, we could solve the whole question of breeding. I would also like to see a substitute for natural pollen worked out. If we could produce drones that would dominate and make pollen or the equal of pollen at will in the spring, the beekeeper would hold the future in the hollow of his hand."—Geo. Gilbert, Broome County, N. Y.

TALKS TO BEGINNERS

Geo. S. Demuth

The beginner who has already come into possession of a colony or colonies of bees and is carrying them through the first winter will learn many interesting things about these wonderful insects even during the coldest part of the winter. It is neither convenient for the beekeeper nor conducive to the prosperity of the bees to open the hive in the winter to learn how the bees, which are so helpless as individuals in resisting low temperatures, manage to survive the bitter cold by co-operative effort. But in spite of this and the advice in the books and journals on beekeeping against disturbing the bees in winter, the ambitious beginner can not be expected to refrain from taking a forbidden peep into the hive occasionally. If this is done carefully he will learn that it does no particular harm to take off the packing at the top of the hive and lift the cover gently to see the winter cluster, or in case of box hives to tip the hive back and look in from below a few times during the winter. Some put a sheet of glass on top of the hive instead of the cover, then over this place a cushion filled with chaff or planer shavings or several thicknesses of an old blanket, which can be lifted away, revealing the winter cluster down among the combs.

How Bees Keep Warm in Winter.

During the coldest weather the bees do not occupy the hive to the outer corners as they do in summer, but they huddle together in a somewhat spherical cluster, even though the combs divide the cluster into several parts. The somewhat spherical shape of the cluster can be clearly seen by looking down between the combs. The bees on the outside of the cluster appear to be quiet. These bees form the outer crust of the cluster, being closely packed together to prevent the escape of heat. Inside the cluster the bees are more active.

The size of the cluster varies with the temperature. As the temperature of the air inside the hive goes down, the cluster becomes smaller and, of course, more compact, and as the temperature again rises the cluster again expands. In double-walled hives or in hives that are packed by placing them within a larger box and filling in between the hive and box with some non-conducting material, such as chaff, forest leaves or planer shavings, the clusters are larger than in the colonies of the same size not so protected, and the bees, of course, have less difficulty in keeping themselves comfortable.

Thus by forming a wall of living bees the temperature inside the cluster is kept high enough so that the bees are comfortable, even though the outside temperature is below zero, as long as they have a supply of honey available to the more active bees inside the cluster. If, during a long cold spell, the honey that is within the cluster is all consumed, the colony is like a family without fuel and, unless the outside temperature rises in time to permit the cluster to move upward and envelop more honey, it will perish even though an abundant supply of honey is within an inch or so of the margin of the cluster. This sometimes happens in prolonged cold spells in unprotected hives, but strong colonies in well-protected hives manage to keep in contact with honey even through long severe cold spells.

During most of the winter the bees give up the ordinary activities of the hive such as rearing brood, and devote themselves to the one problem of keeping warm in order that the colony may survive until the normal activities can be taken up again the next spring.

Their dominating instinct during the broodless period of winter is to save their energy to the utmost degree. To us pleasure-loving humans it seems uncanny to observe that honeybees apparently are not only willing but extremely anxious to give up their ordinary life activities and sternly devote themselves to the one problem of prolonging life far beyond its normal span, as though their little brains fully recognized the fact that it is only by each individual saving every atom of energy that the colony is able to survive the long winter until young can again be reared and thus perpetuate the life of the colony. In our ignorance of the reasons for this peculiar behavior we call this instinct.

So strong is the instinct to save energy that only sufficient heat is generated within the cluster to keep its margin up to about 57° F., or barely enough to prevent the sluggish bees that form the outer crust from becoming entirely numb and helpless from cold. During cold spells it requires considerable work to do this; but, as soon as the outside temperature rises, less heat is generated so that none of the heat which costs so much in precious energy is wasted.

Value of Occasional Winter Flights.

An occasional warm day is of great value to the bees, for this enables the cluster to expand and shift to a new position in order to envelop more honey. An

occasional day warm enough for the bees to fly enables them to void their feces. Normally they do this only during flight. If the honey they consume is of good quality so that nearly all of it is digestible and the hives are well protected so that the bees are not compelled to eat so much to keep warm, they can endure confinement without a cleansing flight for several months; but if the honey is poor, or the hive poorly protected, and especially if both of these factors are present, the bees may become so restless because of the lack of a cleansing flight that they wear themselves out many times as fast as they do to just keep warm during the coldest weather. Nothing will relieve this condition except a good cleansing flight.

Dead Bees at Hive Entrance.

Beginners are often alarmed to find many dead bees in front of the entrance during winter or accumulated on the floor of the hive. In many cases this is only a result of the normal death rate in the colony and the dead accumulate because the living are not able to carry them away from the hive during cold weather. The number of bees that die in a colony during the winter depends upon the number of old bees that were present in the fall. Some seasons, most of the old bees die off before cold weather, while other seasons a large number of old bees survive until well into the winter. In well-protected hives the bees that were young in the fall should not die during the winter, but in unprotected hives even colonies made up mostly of young bees may become greatly depleted during the winter. Sometimes when bees are wintering poorly so many dead bees accumulate on the floor of the hive that the entrance is closed with their bodies. When this occurs they should be raked out with a piece of wire with a hook bent on one end. If the hive entrance becomes closed in any way, the bees become quite restless as soon as they discover that they are imprisoned. Sometimes ice is formed from melting snow in such a manner as to close the entrance. While this may do no harm during very cold weather, the bees should not be left thus imprisoned when it warms up. The only safe way is to see that there is a small opening through the hive entrance at all times. The entrance should be blocked down to an opening about ⅜ by 1½ inches during cold weather.

Sometimes the bees are tempted out for a flight when the ground is covered with snow and becoming confused in the dazzling light drop into the snow where they soon become chilled. When many bees are seen thus chilled in the snow the only comforting thought is that most of these are old bees that would soon die from old age and that the loss of these bees may not be serious.

Where snow is abundant it sometimes covers the hive entirely and the beginner would naturally think that they would smother. It should be remembered that when the bees are comfortable during the winter they are so nearly dormant that they need but little air. It is not advisable to shovel the snow away from the hive, but it should be left since it adds further protection and the bees will obtain all the air they need through the porous snow.

Purchasing Colonies in February.

Those who expect to purchase their colonies of bees locally may as well do so during this month, especially in the South. There is no hurry about purchasing bees in the North, neither is there any good reason why a beginner should wait until spring provided he is able to pick out good colonies.

It is possible to tell something about colonies by opening the hive and looking in from the top even during the winter; or, if the hive is of such a character that it cannot well be opened at the top, by tipping it and looking in at the bottom. Strong colonies should occupy at least five or six of the spaces between the combs when closely clustered as they are during cold weather. They should also have from 20 to 40 pounds of honey in the hive. The amount of honey can be estimated by weighing the hive as it stands, then deducting the weight of the hive filled with empty combs and allowing five or six pounds for the bees and some pollen.

If good colonies of bees are not available locally the ambitious beginner may purchase bees in box hives or in modern hives having crooked combs and transfer these in the spring, but, of course, such colonies are not worth as much as colonies in good hives having straight combs. In fact, they are not worth more than half as much.

Another good way to make a start in beekeeping is to purchase bees in a package, together with a queen as put out by the breeders, and put them into a new hive. These package bees may be purchased from a southern breeder so as to have a two-pound or three-pound package build up to a full colony in time to take advantage of the honey flow. This method of making a start with bees will be discussed later, but it is not too soon to begin making plans in order to have the bees delivered in April or early in May so that they will have time to build up to full strength for the honey flow.

JUST NEWS
Editors

The Michigan Agricultural College, East Lansing, Michigan, will give a short course in beekeeping February 11 to 23. This course is planned to cover the subject in a comprehensive manner, including marketing.

* * *

The New York State College of Agriculture of Cornell University has inaugurated a monthly news service for the beekeepers of New York State, in the form of a news letter. Thus far these letters have been devoted largely to the subject of marketing. Prices received by beekeepers as well as prices paid by consumers are reported by local representatives of the State Department of Farms and Markets and published in this letter, thus giving market news of great value to beekeepers.

* * *

A short course in beekeeping and horticulture will be given at the North Dakota Agricultural College during the week beginning February 11. F. T. Floyd, from the Manitoba Agricultural College, will assist in this course. This short course will no doubt attract many because of the rapid development of beekeeping in this section, which is in the midst of the great sweet clover belt.

* * *

"Mid-West Farm Beekeeper" is the title of a new bee journal launched at Belleville, Kansas, on January 1. Its aim, as declared on the title page, is to "promote profitable beekeeping and related lines among farmers." The editor and business manager is J. W. Kuhn. The subscription price is 50c per year.

* * *

The Pennsylvania Beekeepers' Association held its annual meeting on January 24, 25 and 26. Among the speakers at this meeting appear the names of J. C. Hambleton, Apicultural Assistant, Bureau of Entomology, Washington, D. C.; Prof. N. E. Phillips, Extension Apiarist, State College, Penn.; Geo. H. Rea, Reynoldsville, Penn., and Dr. J. C. Hutzelman, Glendale, Ohio

* * *

Purdue University, Lafayette, Ind., will give a short course in beekeeping February 11 to 14. This course is planned not only for beginners but for commercial beekeepers as well. Dr. E. F. Phillips, Bureau of Entomology, Washington, D. C., and Geo. S. Demuth, Editor of Gleanings in Bee Culture, are scheduled to speak each day during this short course.

On Wednesday, Feb. 27, at 7:50 p. m., Prof. R. B. Willson of Cornell University will broadcast by radio a talk on honey from Station WEAF, New York City, 492 meters. All beekeepers who have a radio should mark this date on their calendar and be sure to tune in this station at that time.

* * *

Prof. F. B. Paddock, State Apiarist of Iowa, is scheduled for two radio talks from the Ames station, 360 meters. One of these talks will be given on March 28 on the subject of "Spring Care of Bees," and one on May 23, "Preparations for the Honey Crop." These talks will be given at 12:40 noon. The Ames station is known as WOI. It would seem that a radio outfit will soon become a part of the beekeepers' necessary equipment.

* * *

As announced last month the Ohio State Beekeepers' Association will meet on February 7 and 8 at the Ohio State University. Several out-of-state speakers will be present and a large attendance is expected. Dr. J. C. Hutzelman, who developed the alcohol-formalin solution for sterilizing combs containing American foul brood, will explain how to obtain best results from this solution.

* * *

The Kansas State Beekeepers' Association will meet at Topeka, Kansas, February 4 and 5, then at Manhattan, Kansas, February 6 and 7.

* * *

The Tennessee State Beekeepers' Association will meet at Nashville, Tennessee, on February 1. Several out-of-state beekeepers are expected to attend this meeting.

* * *

The "Wisconsin Beekeeping" is the name of a new publication published by the Wisconsin Beekeepers' Association. This is to be published monthly for the benefit of Wisconsin beekeepers. The first issue (January) is devoted largely to a report of the Association meeting held in Milwaukee in December.

* * *

The seventh International Apiculture Congress will be held in Quebec, Canada, from September 1 to 4, 1924, for the academic section and continued to September 10 for excursions. There will be a French section and an English section, so that Americans and Canadians who can not understand French will be able to hear the entire program in their own language.

A. I. Root's Story of His Own Life

O Lord, how great are thy works! and thy thoughts are very deep.—Ps. 92:5.

(No. 8.)

I HAVE always been an enthusiastic admirer of old Dame Nature's mysterious ways and workings.

In August, 1865, a swarm of bees passed over us near our place of work. One of my employees, remembering that I had expressed a wish for a swarm of bees, jokingly asked what I would give for them as they were circling slowly along in mid-air. Thinking it impossible for him to get them in their position, I offered him a dollar for them securely boxed.

He shortly returned with them in an old saleratus box and asked me where I would have my property taken. After a hasty consultation, I decided upon what I then thought would be a splendid location for them, that is, an unoccupied third-story room of our manufactory.

In the evening my instructor in the mysteries of beekeeping (the person who hived them) raised the box, an operation, by the way, which seemed to me almost equal to facing a lion in his den, and showed the busy multitude gathered into a compact cluster in the top, and he informed me that my swarm was not a large one, although the countless number seemed to me an immense multitude.

That evening other books and papers had to be laid aside in favor of anything pertaining to bees and bee culture. Our book stores contained nothing on the subject and I had to content myself with what I could learn from the agricultural papers.

The next day, as the bees seemed busily engaged, I supposed them all right. The third day they were still at work, that is, they were doing something. Later on in the day I went up to see how they were getting along, congratulating myself that there must be some pounds of honey by this time, and thinking that I should have to get my glass jars ready. But, where before had been the busy stir and bustle, now all was still. On raising the box, what a deserted appearance! Not a bee, not a particle of comb. They were all gone—effectually and surely beyond my reach.

In my ignorance of their habits, I had placed them before a west window, with the sash raised, exposing them to the full heat of the afternoon sun, and after waiting two days they had probably concluded they could suit themselves better.

The bees were gone, but the interest they had awakened still remained, and I had learned a few facts about bees.

One morning, soon after, I told Mrs. Root that I had important business in Cleveland, 30 miles away. She supposed it was something connected with the jewelry business, but it was really to go to the book stores and hunt up whatever I could find on bees. In those days it took a whole day to go to Cleveland in a stage coach and another to get back. In the bookstores I found three good-sized books, Langstroth, Quinby and one by C. B. Miner. I selected Langstroth and then sat up pretty much all night at the hotel reading it.

Reads Langstroth on the Honey Bee.

I can not remember that I ever got hold of anything in my life that gave me such keen pleasure and enjoyment as did Langstroth's wonderful revelations of the mysteries of the beehive. Years before I had read Robinson Crusoe with much interest and enthusiasm, but now I found "truth stranger than fiction."

Very soon I collected all the agricultural papers that contained articles on beekeeping. My sister, who was clerking in the jewelry store, told my wife that it was really too bad, the way I "pumped" every old farmer in regard to what he knew about bees. She said, after they had given me all the information they possibly could, they looked so weary and troubled and evidently wanted to get away so badly that she really felt sorry for them.

I soon got in touch with Mr. Langstroth, and in that way found out about the Italian bees. I learned that a bee journal had been started and that it had been kept going for three years, but had then been discontinued for lack of patronage. I scraped up an acquaintance with the editor, Samuel Wagner (one of God's noblemen), and by my enthusiasm induced him later to recommence the publication of the American Bee Journal, at Washington, D. C.

Of course, I soon had another swarm of bees, although it had seemed to me for a time as if I should never think as much of any others as I did of the first. About this time I was warned that the

whole business was impossible. To take a hive of live bees apart and put them back was sheer madness. Everyone thought I had gone crazy. My new bees I brought home on a stick. A helper taking one end, we carried them by hand the whole mile, as it was hot weather. I placed them upstairs over a woodhouse to be out of the way, as "The Ohio Farmer" recommended keeping them on the second floor. The next morning before daylight, I was watching for the first bee to sally forth.

Because of the new surroundings this first bee made a few tours of inspection about its new abode before leaving for the field. It was soon followed by another and then by two, three or half a dozen, until there was quite a scene of activity, all hovering about, with their heads turned toward the hive to mark its location.

After having been called to breakfast several times, I finally concluded that the bees would work just as well without being watched.

I had already manufactured a Langstroth frame hive and had taken pride in having it well made just as he had recommended in his book. I began to feel very anxious to see how much better the bees would work in the improved hive than in the one they were then occupying.

First Job of Transferring Bees.

Mr. Langstroth's directions for transferring were rather brief for a beginner, but I had unbounded confidence in my skill with bees after having read so much on the subject, and so I intended to transfer them as soon as they had become used to their location. By afternoon, however, they seemed so much at home that I concluded that the thing might be managed almost without their knowing it. It is true, it was a hot day, and Mr. Langstroth had cautioned about handling honeycombs in hot weather, but I could not bear to think of my bees being any longer without the great conveniences (?) of movable-frame hives.

I had provided a bee-hat, a clumsy wire-cloth affair, so I commenced by blowing a little smoke into the hive. I then turned the hive bottom up, removed the sliding bottom-board and put on an empty box. I felt considerably elated at my success, as they seemed perfectly thunderstruck and of course docile. For a decoy hive to catch returning bees, I had used my new hive, as I supposed they would go right in and begin work. But it was so unlike their former home that they only flew around in dismay and refused even so much as to look inside.

The book was near by with a heavy chisel across it to hold it open, and it informed me that the next thing was to drive them into the box, which I did systematically. I removed the box and bees to a smooth board and shut them in tightly, so that they might not fly away as my first ones had done. I discovered later that bees must have ventilation.

The next thing, according to the book, was to pry off one side of the hive with a stout chisel. All right, but the hive was screwed together with heavy screws so badly rusted that I could not get them out, and as a last resort the combs had to be taken out at the bottom and at one side where there had been a pane of glass. As it was August, some of the combs did get a little bruised, so much in fact that I called to my wife for a large pan and poured the honey out of the hive into it, bees and all, as some of them remained in the hive. These were strained out and carried back to lick each other off, as the book said they would do, and I busied myself in tying combs into the frames.

I was thinking at the time that there seemed to be a great many bees about, but supposed it to be those that were out foraging. I felt quite relieved after getting the last piece of comb into the frames, and I put them safely in the hive where it had stood all the time.

The next thing was to put the bees in. On opening my box, the bees shut up there looked as bad as those which had been strained out of the honey. I put some of them in front, but they would not crawl in (fly they could not). Finally I dumped the whole mass on top of the frames and poked them down through, but they only crawled out again, down into the dirt. A part of them that were better off would persist in clustering up by the window on the roof overhead, in short, anywhere except in that Langstroth hive.

Finally, by night, after much time and trouble, I had some of them in the hive, the robbers having licked them off and also having licked their hive out clean. These robbers were also on hand the next morning bright and early, but I closed the entrance nearly, and as there was not much in the hive I managed with great care to keep them off for two or three days. But I noticed the bees were continually crawling all over the hive and they seemed disconcerted, until one morning I discovered a cluster of them apparently almost dead, on the under side of a bench a few feet from the hive. These I placed on the alighting board and was very much surprised and elated to see a strangely shaped, long, black bee stalk majestically from the midst of the cluster to the entrance and go in, and then there was rejoicing both by the bees and by myself as I knew that I had

(Continued on page 118.)

Classified Advertisements

Notices will be inserted in these classified columns for 7c per word. You must say you want your advertisement in the classified columns or we will not be responsible for errors. For special conditions on bee and queen advertising please write us. Copy should be received by 15th of preceding month to insure insertion. Cash with copy, if credit has not been established previously.

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CLOVER-BASSWOOD honey in new 60-lb. cans. Sample 20c. W. B. Crane, McComb, O.

FOR SALE—Honey for baking purposes, also amber for table use. D. R. Townsend, Northstar, Mich.

EXTRACTED honey, two 60-lb. tins, white clover, $14.50; light amber, $13.00. J. G. Burtis, Marietta, N. Y.

FOR SALE—Comb and extracted white clover honey. Prices on request. Dr. E. Kohn & Son, Grover Hill, Ohio.

FOR SALE—White clover honey in new 60-lb. cans, 11c per lb. Sample, 20c. Hoehn & Honigford, Ottoville, Ohio.

CLOVER-BASSWOOD honey in 60-lb. cans. State quantity wanted. Sample 15c. E. Hassinger, Jr., Greenville, Wis.

CHOICE white clover extracted honey in new 60-lb. cans. Prices on request. W. X. Johnston, Port Hope, Mich.

FOR SALE—Finest new white clover honey in new 60-lb. cans and 5-lb. pails. Sample 15c. A. S. Tedman, Weston, Mich.

FOR SALE—10 barrels fine-flavored white extracted honey, 10c per pound. Sample, 10c. A. F. Brown, Daytona, Fla.

FOR SALE—Clover-basswood and clover honey; also fall honey and buckwheat, in 60-lb. cans. G. M. Brewer, Medina, N. Y.

HONEY FOR SALE—In 60-lb. tins; white clover, 13c; for immediate shipment from New York. Hoffman & Hauck, Woodhaven, N. Y.

FOR SALE—Clover, amber and buckwheat honey in 5-lb. pails and 60-lb. cans. C. J. Baldridge, Homestead Farm, Kendaia, N. Y.

WANTED—Both comb and extracted honey. Name your best price in first letter. M. V. Facey Honey Co., Preston, Minn.

FOR SALE—40 cases fancy No. 1 white clover comb honey, $5.50 per case; 24 sections per case. Winkler Honey Co., Joliet, Rt. 1, Ill.

FOR SALE—White clover honey, new cans and cases, two 60-lb. cans to case, $14.40. J. J. Lewis, Lyons, N. Y.

FOR SALE—Extracted clover honey in 60-lb. cans. Almost water white. New cans. Floyd Markham, Ypsilanti, Mich.

CHOICE extra-fancy white clover honey in new 60-lb. cans, 120 lbs. net, $14.00. Sample, 20c. Edw. A. Winkler, Joliet, Ills., R. F. D. 1.

FINE quality clover honey, 60-lb. cans, $8.40; case of two, $15.60. Sample, 15c. Satisfaction guaranteed. Wm. F. Vollmer, Akron, N. Y.

FOR SALE—Extra-choice white clover honey, case or carload. Sample, 15c. Also about 60 cases choice light amber. David Running, Filion, Mich.

WANTED—A car or less quantity of clover honey in 60-lb. cans. Mail sample and quote lowest cash price for same. A. W. Smith, Birmingham, Mich.

FOR SALE—White honey in 60-lb. cans, also West Indian in 50-gal. barrels. Samples and prices on request. A. I. Root Co., 23 Leonard St., New York City.

FOR SALE—Finest white honey from the clover fields of Missaukee County. Per case (120 lbs.), $14.50; discount on larger lots. J. H. Corwin, Merritt, Mich.

FOR SALE—20 cases sweet clover honey, light color, well ripened on hive, only best taken, new 60-lb. cans, $14.40 per case. J. Frank Haan, Des Plaines, Ill.

FOR SALE—A very fine quality of clover honey in new 60-lb. cans and 5-lb. pails. One case or carload. Also buckwheat honey in cans and kegs. H. B. Gable, Romulus, N. Y.

FOR SALE—Comb and extracted white clover honey, extracted in 60-lb. cans, and 5 and 10 lb. pails. Prices given on request. Sample, 15c. F. W. Summerfield, Waterville, Ohio.

FOR SALE—Choice clover extracted honey packed in new 60-lb. cans and cases. Write for price stating quantity desired. Also have a few cans of amber honey. J. D. Beals, Oto, Iowa.

FOR SALE—Michigan white extracted honey in 60-lb. cans. Sample, 15c. State quantity wanted. Attractive rates for the larger orders. M. H. Hunt & Son, 510 N. Cedar St., Lansing, Mich.

VERMONT clover comb honey in 24-section cases, 4¼x1½ sections in cartons and fiber shipping cases for safe shipment. Six cases to the crate. Very fine quality. J. E. Crane & Son, Middlebury, Vt.

"OLD KY." clover extracted honey. The same kind that won first prize at Lexington, Ky., Fair. 1 60-lb. can, $8.50; 2 60-lb. cans, $16.50, f. o. b. here. Sample, 15c. Brook Dale Farm, Brooksville, Ky.

FOR SALE—24 cases No. 1 dark comb, and 24 cases No. 2 white comb honey, 24 sections to case, six cases to carrier, at $4.00 per case. Dark extracted (about half clover), 10c per pound, 2 60-lb. cans to case. H. G. Quirin, Bellevue, Ohio.

FOR SALE—Honey in 60-lb. cans. Sweet clover, basswood, white clover and other flavors. Tell us what you want. Beekeepers who need more honey for their trade and solicitors should write us. A. I. Root Co., 230 West Huron St., Chicago, Ill.

RASPBERRY honey for sale. Left on the hives until thoroughly ripened by the bees. It is thick, heavy body, rich and delicious. Put up in 60-lb. cans, two cans to case for $15.00, and one for $8.00. Sample by mail for 20c, which may be applied on purchase. Elmer Hutchinson & Son, Lake City, Mich.

FOR SALE—Fine quality clover honey in 60-lb. cans. Sample 10c. Geo. M. Sowarby, Cato, N. Y.

WHITE extracted honey, white clover, basswood and sweet clover, very fine color and body. It will please your customers. 60-lb. cans and 5-lb. pails. Sample, 15c. W. A. Jenkins, 10 Bluff St., Hamburg, Iowa.

HONEY AND WAX WANTED.

OLD COMBS, cappings or slumgum wanted for rendering by steam press process. We pay cash for wax rendered, trade for supplies or work it into foundation. W. T. Falconer Mfg. Co., Falconer, N. Y.

WANTED—Shipments of old comb and cappings for rendering. We pay the highest cash and trade price, charging but 5c a pound for wax rendered. The Fred W. Muth Co., Pearl and Walnut Sts., Cincinnati, Ohio.

OLD COMBS WANTED—Our steam wax presses will get every ounce of beeswax out of old combs, cappings or slumgum. Send for our terms and our 1924 catalog. We will buy your share of the wax for cash or will work it into foundation for you. Dadant & Sons, Hamilton, Ill.

FOR SALE.

PURE beeswax rendered from cappings. Winkler Honey Co., Joliet, Ill.

USED beehives. CLEAN. P. S. Crichton, 47 Alma Ave., Waverley, Mass.

HONEY LABELS—New design. Catalog free. Eastern Label Co., Clintonville, Conn.

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HUBAM clover seed, 1923 crop, Wisconsin grown. Write for prices. A. C. Baumgarten, Thienville, Wis.

ROOT bee supplies and AIRCO foundation for 1924. A. V. Small, successor to C. F. Buck, Augusta, Kans.

SEND TODAY for samples of latest honey labels. Liberty Pub. Co., Sta. D., Box 4003, Cleveland, Ohio.

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FOR SALE—Two Hatch wax presses, regular price, $15.00, our price, $10.00 each. The Stover Apiaries, Mayhew, Miss.

FOR SALE—Soiled cane sugar for feeding bees. Get your supply now for spring feeding. Winkler Honey Co., Joliet, Ill., Rt. 1.

FOR SALE—500 8-frame shallow supers, with frames, used once, $20 per 100. J. Curtis Alexander, R. F. D. No. 1, Asheville, N. C.

THOROUGHLY equipped apiary, bearing fruit trees, and 4-room house. A bargain. For further particulars address A. Beyer, Krotz Springs, La.

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ADAPTABLE BEEHIVES, single or double walled, are sound in principle and are practical. For free information address Geo. P. Wood, Peekskill, N. Y.

ATTRACTIVE LOW PRICES—Write us for list of odds and ends, shipping cases, hives, etc., first grade, priced to save you money. Dadant & Sons, Hamilton, Ill.

BLACK RASPBERRIES pay big profits. Easily grown anywhere. Bees sure do like their blossoms. Good plants for sale, reasonable. Frank Payne, Shawnee, Kansas.

ROBINSON'S comb foundation will please the bees and the price will please the beekeeper. Wax worked at lowest rates. E. S. Robinson, Mayville, Chau. Co., N. Y.

FOR SALE—150 shallow extracting frames, nailed; 4 Excelsior covers, 8-frame; 4 bottom-boards, 8-frame; 5 division-board feeders, new. Price, $7.50. Alvin Buff, Frost, Ohio.

FOR SALE—My apiaries at Willcox, Ariz., 450 colonies, complete outfit for extracted honey. Excellent crop prospect. Will consider leasing. W. J. Stahmann, Clint, Texas.

LOOSE-HANGING white pine frames, 3c; queen cages, 2c. Sample on request. Ten-frame chaff hives, nailed not painted, $5.00. Write for particulars. Radloff Bros., Cable, Wis.

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IDAHO white-pine bee supplies, select material, excellent workmanship. Prices low. Satisfaction guaranteed. Write for sample and prices. John E. Thomson, Coeur d'Alene, Ida.

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SPECIAL PRICES—We are offering at specially low prices some very high-grade material in shipping cases, frames, hives and miscellaneous which represent items we no longer carry regularly in stock or which have to be closed out to make room for new stock specially equipped to take Dadant's Wired Foundation. If interested, write for list; we can save you money. Dadant & Sons, Hamilton, Ill.

FOR SALE—In lots amounting to $10 or more, 100 reversible bottom-boards, 50c; 100 metal covers with inners, 80c; 180 full-depth brood-chambers of wired drawn comb, $2.00; 30 zinc excluders, 20c; 40 colonies of bees, all colonies guaranteed free from disease, two-story, metal covers, wired combs, requeened in August, $10. All the above are 10-frame standard goods, well painted, nearly new, and disease free. Am selling on account of having no time to look after bees. All prices f. o. b. Newport, Ky., except bees. Dr. Roy Beckett, 50 Forest Ave., Ft. Thomas, Ky.

FOR SALE—Near Syracuse, N. Y., 4½ acres city lot property, one acre in golden seal and ginseng beds, excellent condition, drier, ¼ acre asparagus, young bearing orchard. Bee supplies, extractor, double and single walled hives. Two-family house, sleeping porch, 2 fireplaces, hot water heat, pergola, lawn for tennis, a three-story grouted barn, Beeman tractor, horse, running water. Street is new concreted. Price $15,000, one-half cash, or 5 per cent off for all cash. One acre of golden seal and ginseng alone, $6000. Garret Welch, 1 Liberty St., New York, N. Y.

THERE is a splendid opportunity to purchase the entire stock, and western and other connections for selling, with an increasing demand for honey, of Foster & Holtermann, Limited, Brantford, Ont. Prefer selling in block. Address R. F. Holtermann, Brantford, Ontario, Canada.

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WANTED—Extractor, honey pump, capping-melter, tanks, etc. L. M. Gulden, Englevale, N. Dak.

I have second-hand 8-frame hives to trade or for cash at a bargain. Delbert Lhommedieu, Colo, Iowa.

WANTED—To buy one second-hand reversible extractor, either two or four frame. State your lowest price in first letter. R. F. Pratt, Cuyahoga Falls, R. F. D. No. 11, Ohio.

WANTED—25 to 75 comb-honey supers for 4 x 5 inch sections; 25 Woodman winter hives or Sheboygan Portable winter cases, and extractor, in good order. State price, freight prepaid. Samuel Cushman, 6 East Lake St., Chicago, Ill.

BEES AND QUEENS.

HARDY Italian queens, $1.00 each. W. G. Lauver, Middletown, Pa.

FOR spring package bees and queens, write P. B. Skinner, Greenville, Ala.

NUCLEI, packages, queens for 1924. Send for circular. Allen Latham, Norwichtown, Conn.

SEE our advertisement for PACKAGE BEES on page 118. Loveitt Honey Co., Phoenix, Ariz.

GOLDEN Italian Queens bred by an experienced breeder. Price, $1.25 each; $11.00 per doz. Honoraville Bee Co., Honoraville, Ala.

FOR SALE—Three-banded leather-colored queen bees. None better. Write for prices. M. Bates, Greenville, Ala., R. F. D. No. 4.

PINARD'S Quality Queens and package bees. Now booking orders for 1924. Circular free. Yours for better bees. A. J. Pinard, Morgan Hill, Calif.

BRIGHT Italian queens, 1, $1.00; 12, $10.00; 100, $75.00. Write for prices on package bees. T. J. Talley, Greenville, R. F. D. No. 3, Ala.

WELL, we are down here among the frogs in the swamp, off of the classy stuff and still have a few bees to sell. See past ads. J. G. Puett & Sons, Moultrie, Ga.

PACKAGE BEES, NUCLEI and QUEENS. Pure bright three-banded Italians. April and May delivery. Free from diseases. Get my prices and circular before ordering. Guarantee safe arrival. J. L. Morgan, Apalachicola, Fla.

NUCLEI—I am offering for sale 1000 three-frame nuclei containing a good tested three-banded Italian queen in each, $4.00 each, for 1924 spring delivery. John St. Romain, Marksville, La.

GOLDEN ITALIAN queens for sale. 1, $1.00; 6, $5.00; 12, $10.00; 100, $75.00. Package bees in season, 20 per cent to book your order for spring delivery. J. F. Rogers, Greenville, R. D. 3, Ala.

FOR SALE—Golden Italian queens, untested, $1.15 each; 6 for $6.50; 12 or more, $1.00 each. No disease of any kind. Safe arrival and satisfaction guaranteed. Sam Hinshaw, Randleman, N. C.

MY five-banded golden queens will be ready April 1. 1 queen, $1.00; 6 queens, $5.50; 12 queens, $10.00. W. W. Talley, Greenville, Ala., Rt. 4.

I CAN interest you in your package bee and queen requirements for 1924. A card will bring my circular and price list. R. V. Stearns, Brady, Texas.

BOOKING orders now for spring delivery of package bees with queens. Let us mail you a descriptive price list. M. C. Berry & Co., Montgomery, Ala.

GOLDEN ITALIAN queens, producing large beautiful bees, solid yellow to tip. Package bees, nuclei circular, 1924, ready free. Dr. White Bee Co., Sandia, Texas.

OUR strain of bees is better than ever. If you have never tried them now is your chance. Circular and price list for the asking. M. C. Berry & Co., Montgomery, Ala.

BOOKING orders now for queens and bees, April and May shipment, from one package to carload. If you want bees it will pay you to write me. E. J. Beridon, Jr., Mansura, La.

THREE-BANDED bees and queens, government inspected. 2-lb. package with select queen, $5.00; select tested queens, $2.50; untested, $1.00 each or $10.00 per dozen. Carolina Bee Co., W. O. Curtis, Mgr., Rt. No. 1, Graham, N. C.

WE are booking orders for bees for 1924 spring delivery, any amount from carload lots down. We ship packages, nuclei or full colonies. We are also booking orders for queens. Prices on request. The Citronelle Apiaries, Citronelle, Alabama.

BOOKING orders for three-banded Italian bees and queens; two-pound packages with select untested queen, $4.25; 10 or more, 10 per cent discount. Select untested queens, $1.00; select tested, $1.50. Satisfaction guaranteed. J. Allen, Catherine, Ala.

ITALIAN QUEENS, 1 to 5, $1.00 each; 6, $5.50; 12, $10.50; 1 lb. bees with queen, $3.00; 2 lbs. bees with queen, $5.00; 3 lbs. bees with queen, $7.00. We pay delivery charges up to Zone 6. Graydon Bros., Greenville, R. F. D. No. 4, Ala.

GOLDEN Italian Queens for 1924. The big bright hustling kind. Satisfied customers all over the U. S. Untested, $1.00 each; 6 for $5.00; 12 for $10.00; 100, $75.00; tested, $1.75. A few 2-frame nuclei at $4.50 with queen. E. F. Day, Honoraville, Ala.

BEES—Three-pound packages, three-frame nuclei and three-frame nuclei with two and one-half pounds extra bees. April and May delivery. None better. Address, during January, David Running, Filion, Mich. After January, Running Apiaries, Sumterville, Ala.

SELLING 2-frame nuclei and 2-lb. packages with select untested Italian queen, at $3.25 each. Will book a limited amount at this price during January and February. If interested in large quantities write at once. Everything guaranteed. Baughn Stone, Clarksville, Texas.

EARLY QUEENS—My 1923 tested queens now ready at $1.00 each. Untested queens after April 1, 1924, $1.00 each, $90.00 per 100. Two-pound packages priced on request. Pure three-band Italians only, grown by the very best methods. D. W. Howell, Shellman, Ga.

FOR SALE—Queens, $1.00 each, with one patent frame free with each order. Quantity orders less. Queen-breeders, try our cages. Sample free. Part cash, part bees and queens. We will ship package bees from several different states. If you want our frames, order them early. F. M. Russell & Co., Roxbury, Ohio.

FOR SALE—Three-band Italian queens and bees for spring delivery. One 3-frame nucleus with one pound extra bees, with untested queen, for $5.00. Write for prices on larger quantities. No disease. Safe delivery and satisfaction guaranteed. J. E. Arthur, Register, Ga.

FOR SALE—Carload of bees, also nuclei and pound packages of hustling three-band Italians. 3-frame nuclei, with queen, $5.00 each; 2-frame nuclei, with queen, $3.75 each; 3-pound package, with queen, $5.00; 2-pound package, with queen, $3.75; 1 queen, $1.00; 12 queens, $11.00. Orders booked free. W. E. Buckner, Mt. Vernon, Ga.

PACKAGE BEES and QUEENS, DELIVERED—Bright Italians, 2-lb. packages, with selected queen: 1-5, $4.75; 5-25, $4.60; 25-50, $4.40; 50 or more, $4.25. Queens, selected, untested, 1, $1.00; 12, $10.00. Safe arrival and satisfaction guaranteed. No disease. Ship nothing but the best. 20 per cent cash books order. Begin shipping April 15. W. C. Smith & Co., Calhoun, Ala.

HIGH-PRODUCING BEES AND QUEENS—We can still accept a few more orders for package bees and queens for spring shipment. Place your order now. We ship 2-lb. packages only. Safe arrival and satisfaction guaranteed. Write for circular and price list. J. M. Cutts & Son, R. D. 1, Montgomery, Ala.

SPECIAL price on package bees for 1924 delivery. I am offering a 3-lb. package with queen, at $4.00 each; 4-lb. package with queen, at $5.00 each. Each package will contain a select untested three-banded Italian queen and a comb of brood and honey for feed in transit. Guaranteed safe delivery, health certificate with each shipment for delivery between April 5 and July 1. Address John St. Romain, Marksville, La.

I'M offering a 3-lb. package of bees with a selected untested three-banded Italian queen for $5.00; 25 pkgs., $4.75 each. Bees are shipped on a standard frame of honey and brood. Do you realize that a frame of brood will equal a pound of bees? Queens are introduced in package, subject to be laying en route. We have no bee diseases. Will start shipping April 25. 10 per cent books your order. C. A. Mayeux, Hamburg, La.

PACKAGE BEES FOR 1924—Yancey hustlers; they get the honey. Three-band strain only. Now booking orders for spring delivery. Place your order early and make sure of shipping date; 10 per cent will book your order. We do not book more orders than we can fill promptly. Safe arrival and satisfaction guaranteed on every package and queen shipped. Caney Valley Apiaries, Yancey Bros., owners, Bay City, Texas.

PACKAGE BEES and ITALIAN or CARNIOLAN QUEENS. I save you express charges on northern shipments from my yards near Redding, Cal. (most northern point in California where EARLY PACKAGE BEES and QUEENS can be reared). Eastern and northern shipments via Ogden, Utah, are shipped from San Jose. Untested queens, $1.00; bees, $1.50 per pound. Attractive prices on large orders. J. E. Wing, San Jose, Calif.

BEES AND QUEENS—The same high quality and prompt service and lower prices. Untested queens, $1.00 each; $11.0 a doz.; $80.00 per 100. Select untested, $1.20; $13.00 per doz. Tested, $1.50; breeders, $5.00. A two-frame nucleus or two-pound package, with queen, $4.25; 12 or more, $4.00 each. A three-frame nucleus or a three-pound package, with queen, $5.25; 12 or more, $5.00 each. Send us your order with 10 per cent to book. Balance just before shipment. Safe arrival and satisfaction guaranteed. Jensen's Apiaries, Crawford, Miss.

MISCELLANEOUS.

THE BEE WORLD—The leading bee journal in Britain and the only international bee-review in existence. It is read, re-read and treasured. Will it not appeal to you? Specimen copy free from the publishers. The Apis Club, Benson, Oxon, England. Send us a postcard today. It is well worth your little trouble.

LECTURERS WANTED—The American Civic Reform Union, 501-4 Caxton Building, Cleveland, O., wishes to get in touch with pastors, evangelists and others, who have had platform experience, and who would be interested in giving an occasional lecture on "Girls and Their Perils." Up-to-date lecture material and advertising matter supplied. Further details on request. The Reform Union operates under an Ohio charter and is nation-wide in its scope. Rev. A. S. Gregg of Cleveland is the superintendent.

HELP WANTED.

WANTED—Comb honey man, also helper, state wages expected. References exchanged. R. S. Becktell, Rifle, Colo.

WANTED—Queen-breeder for 1924, beginning March 1. State age and wages expected in first letter. M. S. Nordan, Mathews, Ala.

WANTED—Experienced beekeeper to operate 300 to 400 colonies on shares. Reference required. Good proposition to right party. J. D. Beals, Oto, Iowa.

WANTED—Young man for help in apiary system, April to December. State age, weight, occupation, wages. Roscoe F. Wixson, Dundee, R. F. D. No. 4, N. Y.

WANTED—For season of 1924, two industrious young men of good habits, to work with bees and assist on farm. N. L. Stevens & Son, Venice Center, N. Y.

CAN take two able-bodied, clean in mind and body, students in beekeeping for the coming season. Ample experience and board and more for work. R. F. Holtermann, Brantford, Ont., Can.

WANTED—Experienced helper to assist with 500 colonies and honey sales business. Also inexperienced or student helper at reasonable pay. Chance for permanent position. Ray C. Wilcox, Odessa, N. Y.

EXPERIENCE AND FAIR WAGES to active industrious young man for help in well-equipped apiaries, 700 colonies, April to December. State age, height, weight, occupation, wages. Morley Pettit, Georgetown, Ont., Can.

WANTED—Industrious single man, with general farm experience, to work with fruit and bees for the season 1924, commencing April 1. Good habits the first requisite. Write full particulars first letter. Adams & Myers, Ransomville, N. Y.

WANTED—Single, young or middle-aged man of good habits to work with bees for season of 1924, beginning April 1. Room and board furnished. Please give qualifications and wages expected in first letter. F. D. Lamkin, Poplar Ridge, Cayuga County, New York.

WANTED—Clean, honest, industrious and thoroughly dependable young men with some experience in beekeeping and queen-rearing for work in our yards, season of 1924. Begin March 1st. Fair wages, good associates and valuable experience in one of the South's largest, most up-to-date queen-rearing and package-shipping establishments. Give previous experience, description of yourself and send latest photograph with application. H. C. Short, Mgr., W. D. Achord Apiaries, Fitzpatrick, Ala.

WANTED—Young experienced beekeeper from May 1 to November 1. Bee-Dell Apiaries, Earlville, N. Y.

WANTED—Bright, clean-minded, industrious help for season of 1924. Young man with some experience preferred. Work will be in queen yard as well as outyards. Give age and general particulars in first letter. M. C. Berry & Co., Box 697, Montgomery, Ala.

WANTED—Man with some experience with bees, but desires more. You get the experience here, good board and room. Wages depend on your ability to make good. You have a chance to become manager. References required. Woodward Apiaries, Clarksville, N. Y.

WANTED—A clean, capable, reliable young man to run apiary of 125 colonies for comb honey and work small farm. Monthly wages. Give reference, age and wage desired in first letter. Work at once. Mrs. Geo. E. Goodwin, Lyons, R. F. D. No. 1, Mich.

WANTED—Young man to learn the queen and package business, beginning March 1. Will furnish board and pay small wages. Give references and full particulars in first letter. J. M. Cutts & Son, R. F. D. No. 1, Montgomery, Ala.

WANTED—Industrious young man who has some experience with bees and desires outyard experience, to assist in the case of bees in outyards, March to November. Board and lodging provided. State experience, age, weight, height and wages expected. A. L. Coggshall, Ludlowville, N. Y.

WANTED—Dependable man to work in ten apiaries of 1000 swarms, competent to take charge if necessary. Experience in producing comb honey desirable but not essential. Give full particulars concerning yourself including wages expected and time you will be at liberty in first letter. J. E. Crane & Son, Middlebury, Vt.

WANTED—A young man of energy and character, who wishes an opportunity to learn practical beekeeping where carloads of honey are produced. Every chance to learn, and small wages given. Write, giving age, height, weight, former employment, habits, experience, photo, all in first letter. Over 1000 colonies, 14 apiaries. E. F. Atwater, Meridian, Idaho. (Former Field Agent in Beekeeping, U. S. Dept. Agri.)

WANTED—Single, conscientious, energetic assistant, experienced in extracted honey production desiring long-term employment, to help in 600 to 700 colony business, and general farming on small scale, when not busy with bees. Must be mechanically inclined. Give present occupation, age, height, weight and wages expected in first letter, as well as references regarding character, experience with bees, farm work, etc., or expect no reply. Steady job for right party. Objection to cigarettes and tobacco-chewing. Our equipment is strictly modern, and we practice only the most approved methods, while our large buildings afford the very best of working conditions. Further particulars on request. The Hofmann Apiaries, Janesville, Minn.

SITUATION WANTED.

WANTED—Employment in apiary for coming season. Alfred LeMay, Wisconsin Rapids, R. F. D. No. 2, Box 115, Wisconsin.

YOUNG man with several years' experience wants position in up-to-date apiary. Can furnish excellent references, and go to work March 1. Robert S. Hunter, Mt. Elgin Inst., Muncey, Ont., Can.

YOUNG man with some experience in beekeeping wants job in Wisconsin. Good auto mechanic and all-round worker. Oscar Nelson, Viroqua, Rt. 5, Box 15, Wis.

WANTED—A position with a commercial beekeeper by a married man 29 years of age. Have had eight years' experience with bees, also took a course in beekeeping at the University of Tennessee. Have been manager of the University of Tennessee apiary for the past three years, during which time I taught beekeeping to the vocational students. If desired, good references will be furnished. For full particulars, write H. B. Steeb, Rogersville, Tenn.

CARNIOLANS

are very gentle, very prolific, winter extra well, build up rapidly during the spring, and swarm no more than Italians if intelligently managed. Ask for my **FREE** paper, "**MERITS OF THE CARNIOLAN BEE**," describing Carniolans more fully, best methods of management for comb and extracted honey. The information in this paper will be helpful to you in making your plans for the coming season. **Later** we can supply queens and bees of our own strain of Carniolans—12 years' selection and breeding; **JAN STRGAR, CARNIOLA, EUROPE** strain. Strgar's bees have won 64 prizes in Europe. Breeders imported 1923. **ITALIAN,** Hamilton strain. The mother of this breeder made 577 finished sections of comb honey.

ALBERT G. HANN, Glen Gardner, N. J.

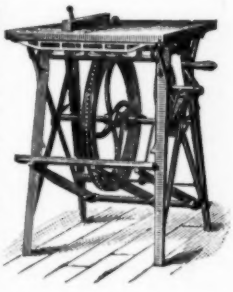
EVERGREENS

Hill's Hardy Tested Sorts

Best for windbreaks, hedges and lawn planting. Protect buildings, crops, stock, gardens and orchards. Hill's Evergreens are nursery grown and hardy everywhere. Hill's Evergreen book sent free Write today. Beautiful Evergreen Trees at moderate prices. World's largest growers. Est. 1855.

The D. Hill Nursery Co., Inc., Dundee, Ill.
Box 246. Evergreen Specialists.

BARNES' HAND & FOOT POWER MACHINERY



This cut represents our combined circular saw, which is made for beekeepers' use in the construction of their hives, sections, etc.

Machines on Trial.
Send for illustrated catalog and prices.

W.F. & John Barnes Co
545 Ruby Street
ROCKFORD, ILL.

HUBAM

Ask for our prices and samples. Scott's Seed Book telling "How to Know Good Seed" is free

O. M. SCOTT & SONS COMPANY,
99 8th Street. Marysville, Ohio.

Do You Know?

THAT the very finest foundation on the market is made from **PURE BEESWAX**—yes, **PURE WESTERN BEESWAX?**

THAT there is no foreign wax of any description used in manufacturing **"SUPERIOR" FOUNDATION?**

THAT "SUPERIOR" FOUNDATION is made from virtually 100% **PURE WESTERN BEESWAX?**

THAT the proper way to compute your foundation cost is to figure the **COST PER SHEET** and not the cost per pound?

Superior Honey Company

Idaho Falls, Iddho — *Ogden, Utah* — *Riverside, Calif.*

P. S.—As **ALL FREE ADVICE** is subject to varying discounts, let us merely suggest without **ADVISING** that you try **"SUPERIOR."** Next month we will give a few gentle hints on frame wiring.

Can Save You Money on

PACKAGE BEES AND NUCLEI

..Black bees, including Italian queens at following prices: 2-lb. package, $3.50; 3-lb., $4.00. 2-frame nucleus, $4.00; 3-frame, $4.50. Lots of 25 or more, deduct 50c each.

I shipped L. C. Heckel, White Bear, Minn., 10 2-lb. packages last spring. On May 7th he wrote: "Received bees yesterday in good condition, possibly a handful dead in the whole 10. It was certainly well done. I want to thank you for your careful and punctual service. Will let you know later how bees have done, etc."

June 13th, just five weeks later (note that) he writes: "Bees are doing fine, nearly all working in the supers and not many black bees left."

You can't beat that much except with 3-lb. packages.

Bees shaken from above excluders; no drones and mostly young bees. No disease in this section. Satisfied everybody last year. Write for pamphlet with testimonials.

Terms: 20% with order, balance before shipping date. Ship from April 20th on.

A. J. HEARD

BONAIRE - - GEORGIA

PLANS FOR POULTRY HOUSES!

All style 150 Illustrations; secret of getting winter eggs, and copy of "The Full Egg Basket." Send 25 cents.
INLAND POULTRY JOURNAL Dept 41 Indianapolis, Ind.

TOO LATE FOR CLASSIFICATION.

LIGHT and dark amber honey in 5-lb. pails, 12 in case. R. C. Wittman, St. Marys, Pa.

FOR SALE—9 60-lb. cans honey, light amber. Write Fred R. Lance, Box 54, Portland Mills, Penn.

FOR SALE—Fine clover honey in new 60-lb. cans. Prices on request. Dr. C. G. Luft, Fremont, Ohio.

FINEST white clover honey, $14.40 per case of two 60-lb. cans. Woodland Farm, R. F. D. No. 3, Ann Arbor, Mich.

FINEST sweet clover honey, 5 and 10 lb. pails; ton, 12c; carload, 11c. Clyde V. Fisher, 1502 Cass St., Omaha, Neb.

FOR SALE—Very finest white clover honey in 60-lb. cans and 5-lb. pails. Sample, 20c. Write C. J. Appeldoorn, Malinta, Ohio.

CLOVER and fall flower blend extracted honey, very fine. 12 5-lb. pails, $8.00. For larger quantities, write for prices. Fred R. Lance, Box 54, Portland Mills, Penn.

ITALIAN QUEENS—Three-banded, bright and leather-colored. Keil superior strain, as raised and sold by him for the past two years. Free advice on beekeeping problems. Introduction instructions mailed when queens are shipped. Satisfaction guaranteed. Price May 15 to July 1, $1.50; July, August and September, $1.00 each. A trial will make you our regular customer. A. T. Keil, Treesdale Farms, Mars, Butler County, Penn.

PACKAGE BEES. Circular free. Van's Honey Farms, Hebron, Indiana.

WILL TRADE package bees for white honey. Mail sample. Van's Honey Farms, Hebron, Indiana.

TRADE jewelry store for apiary or package business in California, $3000. L. A. Smith, Columbia Falls, Mont.

FOR SALE—125 standard ten-frame hive-bodies in flat, or will exchange for bees. Bee-Dell Apiaries, Earlville, N. Y.

FOR SALE—Hive lifter as described in July, 1922, Gleanings. Price, $3.00. The A. I. Root Company, Medina, Ohio.

FOR SALE or trade, copies of Gleanings in Bee Culture from 1908 to 1922. Make me an offer. Fred Lange, Cohocton, N. Y.

GREBE and Western Electric Loud Speaker. One of the best radio receiving outfits. Like new. Van Wyngarden Bros., Hebron, Ind.

YOU can buy package bees with queens for $3.20 each of Townsend. See Bulletin No. 10 on page 121 of this number of Gleanings.

FOR SALE—70 colonies Italian bees in good condition. All colonies guaranteed to be free from disease. R. S. Sheldon, New Smyrna, Box 543, Florida.

FOR SALE—Bright Italian queen, $1.00; 6, $5.00; 1-lb. package bees with queen, $3.00; 2-lb. package with queen, $4.50. Powell Owen, Greenville, Ala.

THAGARD'S ITALIAN QUEENS have stood the test. $1.00 each; 12, $10.00; 2-pound package, $4.00; 12 up, $3.80. The V. R. Thagard Co., Greenville, Ala.

BEFORE placing your order for bees and queen for 1924 delivery, write to us for special prices on quantity lots. The Stapleton Apiaries, Colquitt, Ga.

FOR SALE—10-frame shallow supers, including Hoffman style frames in flat at 75c if ordered before March 1. Sample same price. Postage added. E. Gressman, Hamburg, N. Y.

LONESOME? Then get "A DATE WITH YOUR HONEY" and enjoy the evening. HONE-NUT CHOCOLATES, $1.00 per pound postpaid. Chocolate beehives full of honey and nuts, 2 for 25c or $1.10 per dozen postpaid. Fairmount Apiaries, Schuylkill Haven, Penn.

FOR SALE—30 colonies of bees, all guaranteed to be free from disease. J. Krieg, Shelbyville, Mo.

PHELPS GOLDEN QUEENS will please you. BEAUTIFUL, GENTLE and PROLIFIC. $2.00 each; $18.00 a doz., 6 for $10.00. C. W. Phelps & Son, 3 Wilcox St., Binghamton, N. Y.

CERTIFIED ITALIAN BEES—150 full colonies of this fine strain of leather-colored stock will be sold as usual to make room for necessary increase. Charles Stewart, Johnstown, Box 42, N. Y.

TWO young men want job with modern bee-keepers. South preferred. One experienced with bees, one a mechanic. We want to get into the business. Esra P. Barkman, Hillsboro, R. F. D. No. 3, Kans.

BUY Italian bees from shipper farthest north. Get hardy stock and save expressage. Satisfaction guaranteed. 20 years' experience. Three-frame nuclei and tested queen, $5.00; select tested, $6.00. Orders booked for spring delivery by S. G. Crocker, Jr., Roland Park, Baltimore, Md.

FOR SALE—68 colonies of bees in eight-frame hives and some empty hives. These bees were perfectly healthy my last inspection and guaranteed free from disease. Haven't the time to take care of them. Will take $250 for the lot f. o. b. Write or come and look them over. Arnold Greenbaum, Plain City, R. F. D. No. 1, Box 13, Ohio.

FOR SALE—50 Root Excelsior 10-frame covers, Lewis double-wall 10-frame hives, painted, complete, $3.00 each; Root Jumbo size medium brood foundation in 25-lb. boxes, $7.50; thin super foundation, 5-lb. boxes, $2.75; feeders, shallow extracting supers, etc., at half price. C. O. D. 10 per cent with order. Write Wm. Gabriel, Scribner, Neb.

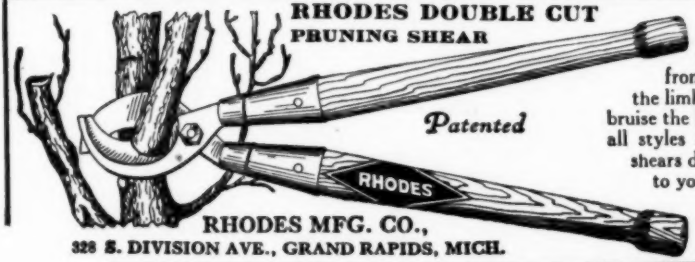
IF you can use untested queens in a wholesale way of, say 25 queens or more, be sure and get Townsend's prices before placing your order. State how many you will need and when delivery is to be made, and I will then tell you just what can be done for you in the way of quality and price. Am making arrangement to furnish many hundred queens from some of our best breeders at a wholesale price that will surprise you. Write me at Loreauville, La., "where the good queens come from." E. D. Townsend.

Berry's Queens and Package Bees

INSURE HONEY CROPS AND THUS FULLEST SATISFACTION TO THE BUYER. SERVICE AND QUALITY OF GOODS BETTER THAN EVER BEFORE. BOOKING ORDERS NOW FOR QUEENS AND PACKAGE BEES. WRITE FOR DESCRIPTIVE PRICE LIST.

M. C. BERRY & COMPANY, Montgomery, Alabama, Box 697

RHODES DOUBLE CUT PRUNING SHEAR



THE only pruner made that cuts from both sides of the limb and does not bruise the bark. Made in all styles and sizes. All shears delivered free to your door. Write for circular and prices.

RHODES MFG. CO.,
328 S. DIVISION AVE., GRAND RAPIDS, MICH.

FREE! ART PICTURES

of Ideal Chickens in Beautiful Natural Colors, 8 x 11 in., suitable for framing. Given only with **Poultry Tribune**—every issue **World's Great Poultry Paper.** Chuck full of money-making ideas, articles, news by foremost poultry authorities. Pub. monthly, 80 to 120 pages. **SPECIAL OFFER:**

5 Big Trial Issues 25c
1 Year 50c; 3 Years $1.00
Send stamps or coin today.
Poultry Tribune, Dpt. 19 Mount Morris, Ill.

Package Bees

VIGOROUS THREE-BANDED ITALIANS

You will get them on date you expect them. Two-pound package with untested queen, $3.25; 5 or more at $3.00 each. No disease, safe arrival and satisfaction guaranteed. Shipping starts April 15. Order with 10 per cent and date of shipping.

R. S. KNIGHT

R. F. D. 2. NEW ORLEANS, LA

PACKAGE BEES. NUCLEI AND QUEENS. BRIGHT THREE-BANDED ITALIANS. April 15 and after.

Two-pound packages with select unt. queens. $4.25 each. Five or more pkgs., $4.00 each. Ten or more pkgs., $3.75 each. Twenty or more pkgs., $3.50 each. **May 15 and after:** One package or one hundred, $3.00 each. Terms: 20 per cent down. Write for guarantee and prices on nuclei and queens.

J. J. SCOTT. CROWVILLE, LOUISIANA.

Get the Best

Pure 3-band Italian stock, a continuous honey flow from March to December, with 29 years' experience in rearing queens enable me to rear the best to be had. Untested: 1, $1.25; 6, $6.50; 12 or more, $1.00 each. 20 per cent books orders.

H. D. MURRY. MAGNET, TEXAS.

I CAN INTEREST YOU

in your package bee and queen requirements for 1924. A card will bring my circular and price list.

R. V. STEARNS, Brady, Texas

GOLDEN QUEENS AND THREE-BANDED BEES FOR 1924.

1 Untested Queen, $1.00; 1 Tested Queen, $1.50; 1 lb. package of bees, $2.00; 2-lb. package of bees, $3.00; 3-lb. package of bees, $4.50. Nucleus, per frame, $1.50; 1 additional pound of bees with nucleus, $1.00. No disease, safe arrival guaranteed; bees inspected.

J. W. SHERMAN, VALDOSTA, GEORGIA.

New Catalog Ready
Beekeepers' Supplies

Root's Goods of High Quality. Three-ply foundation, standard stock of supplies kept on hand for prompt shipments. Send us your inquiries and orders early for quick action.

J. NEBEL & SON SUPPLY CO.
Montgomery County. High Hill, Mo.

(Continued from page 110.)

actually seen that famed personage whose existence was so much doubted by many, a queen bee.

After I found that my bees had their queen, my anxiety for them was relieved, and I had no doubt that under my careful management they would yet come out all right. To make sure, I fed them the honey I had strained them out of, thinking it would be better for them to take it back after they were strong again. Of course, the frames had to be taken out occasionally to see that they were all right and to get an occasional glimpse of that mysterious queen once more.

PACKAGE BEES
One Dollar a Pound

QUEENS ONE DOLLAR ADDITIONAL.
3-Band and Leather-Colored.

NUCLEI

2-FRAME STANDARD LANGSTROTH..$3.00
2-FRAME JUMBO LANGSTROTH..... 3.50
3-FRAME STANDARD LANGSTROTH.. 3.50
3-FRAME JUMBO LANGSTROTH..... 4.00
Send for Circular.

LOVEITT HONEY CO.
602 N. 9th Ave. PHOENIX, ARIZ

Root Quality Supplies

East St. Louis, Ill.

O. G. RAWSON, 3208 Forest Place.
Send for Catalog.

Authorized Distributor for St. Louis district. BEES AND QUEENS.

CANDY FOR WINTER FEED

If you were one of the lucky ones who used this candy last fall and winter you know its worth. To those who have never used it we would suggest a trial. It is really a life insurance for your bees. Send for circular and price.

H. H. JEPSON
182 Friend Street. BOSTON, 14 MASS.

MASON BEE SUPPLY COMPANY,
Mechanic Falls, Maine.
From 1897 to 1923 the Northeastern Branch of The A. I. Root Company.
PROMPT AND EFFICIENT SERVICE.
Because—Only Root's Goods are sold.
It is a business with us—not a side line.
Eight mails daily—Two lines of railway.
If you have not received 1923 catalog send name at once.

Patents Practice in Patent Office and Court. Pat. Counsel of The A. I. Root Co.
CHAS. J. WILLIAMSON,
McLachlan Bldg., Washington, D.C.

70th ANNUAL CATALOG

ROSES of every description and the finest of TREES, PLANTS and SHRUBS

—are listed in the new Storrs & Harrison catalog. Full-colored, hardy, field-grown roses from 60 rich acres. Sure to flower in three months. All except the Climbers and Baby Ramblers are sent trimmed, ready for planting.

Storrs & Harrison flower and vegetable seeds, plants, shrubs, shade and fruit trees are selected for unusual vigor, color or prolificacy. 1200 fertile acres on shores of Lake Erie provide everything your garden, lawn or orchard needs. Get our new catalog before you make your choice.

A post card brings it!

THE STORRS & HARRISON CO.

Nurserymen and Seedsmen for 70 years.

BOX 501. PAINESVILLE, OHIO.

Buy TREES and PLANTS With a GUARANTEE that *really means something*

A guarantee on nursery stock is a new idea—a safeguard to make *sure of what you buy.* Woodlawn Nurseries are not afraid to guarantee what they sell. We grow our own strongly-rooted, vigorous-growing, heavy-bearing trees and plants and honestly GUARANTEE them. The guarantee is plainly printed on and is a part of every order blank.

Our nursery has been celebrated for half a century for Fruit, Nut and Ornamental Trees, Shrubs, Roses, Bushes, Perennial Plants of honest worth.

We are introducers and have exclusive sale of the New Ohio Beauty Apple, a splendid Winter Apple, beautiful in appearance, of delicious flavor; a splendid shipper and heavy, regular bearer. Also the Dr. Worcester Peach. Beautiful, delicious, good shipper and keeper. Extra hardy. A most valuable commercial variety.

We sell to you direct—no commission to agents—you get the benefit in lower prices. Why take chances when you can get *insured* stock? Send for complete illustrated catalogue and growers guide, telling how to obtain best results and best stock at best prices. Write to-day. it is FREE.

WOODLAWN NURSERIES
959 Garson Avenue
Rochester, N. Y.

450,000 TREES.

200 varieties. Also Grapes, Small Fruits, etc. Best rooted stock. Genuine. Cheap. 2 sample Grape-Vines mailed for 20c. Catalog free. West Hill Nurseries, Inc., Box C Fredonia, N.Y.

STRAWBERRY PLANTS

$2.50 Per 1000, and up. Our strong, healthy, tremendous bearing plants guarantee big crops of luscious berries. Best varieties for all kinds of soils. Many new varieties such as **Eaton, Bun Special, Premier, Marvel** and **Cooper.** The world's greatest new Everbearing Strawberry CHAMPION. Full line of Raspberries, Blackberries and Asparagus.

GLADIOLI—ROSES—ORNAMENTALS

Greatly Reduced Prices. Large Stock of good **Grape Plants** at $30.00 per thousand Beautiful new color catalog free. *Write Today.*

BRIDGMAN NURSERY CO., Box 18, Bridgman, Mich.

GOOD SEEDS

Grown From Select Stock —None Better— 54 years selling good seeds to satisfied customers. Prices below all others. Extra lot free in all orders I fill. **Big free catalogue** has over 700 pictures of vegetables and flowers. Send your and neighbors' addresses.

R. H. SHUMWAY, Rockford, Ill.

GUARANTEED TO LIVE

Pure-Bred Chicks, Low prices. Best laying kinds. Also, Turkeys, Ducks, Geese. Catalog Free. Jas. W. Houck & Co., Box 53 Tiffin, O.

Whitesbog Blueberries

a new cultivated fruit that means big profits

Delicious Whitesbog Blueberries are superior in every way to the wild variety. Practically seedless. Average well over one-half inch in diameter. Shipping qualities are excellent. Each variety tested and named.

Sell for approximately $11.00 to $13.00 per 32-quart crate wholesale. Land at Whitesbog is producing 100 bushels per acre. Plants are easy to cultivate, easy to pick, sturdy, long-lived. Early bee pasture. No spraying is necessary. Danger from spray poison is therefore eliminated.

Attractive price offers to commercial growers. Send for new booklet.

WHITESBOG BLUEBERRY NURSERIES
Headquarters for Pure-Bred Blueberry Plants
Joseph J. White, Inc. Box X, Whitesbog, N. J.

OUR QUEENS AND PACKAGE BEES ARE MONEY MAKERS FOR YOU

We are now booking orders for spring delivery, and we will be very glad to send you our circular price list on request. Your order placed with us means that you will receive the wonderful reward from our bees that others are getting. Read what our customers say about them.

"The pound packages came June 10 and are good, strong colonies now. They made an average of 100 pounds extracted honey each." (Name on request.)

"Your queens are just wonderful. On a poor honey flow here this year my pound packages gave me 150 pounds of extracted honey each. I have never had pound packages do so well before, and I have had a lot sent up from the South." (Name on request.)

We guarantee safe arrival, prompt delivery and entire satisfaction. Write for descriptive price list.

Hayneville Apiary Co., Hayneville, Ala.

PACKAGE BEES

2 AND 3 POUNDS

We do not claim that our Italian queens and bees are the best, but we **do claim** that they are as good as **any**. To prove our assertion, give them a test. Receive **fresher bees**, and **save** express charges. Circular free.

VAN'S HONEY FARMS, HEBRON, INDIANA

ITALIAN BEES

FOR APRIL DELIVERY.

Vigorous Three-bands or Goldens. Money back if not entirely satisfied; you to be the judge. 1 to 25, $1.00 each. Clipped when requested. No disease. Honest service assured.

CRENSHAW COUNTY APIARY.
Rutledge, Alabama. U. S. A.

THE PROBLEM SOLVED.

Ever since the first combless packages of bees were shipped, the problem has been to get a shipping package that will put them through in satisfactory condition, and be easy to put in hives. During the past year, co-operating with Mr. J. M. Barr of West Allis, Wis., we have evolved a package that is far more satisfactory than any other in use at present. Light weight, but very strong construction, saves express charges and means no smashed or leaky packages. It puts practically every package through in first class shape in extremes of heat and cold. One 3-lb. shipping box, filled with 4½ lbs. of bees as a test, left here on June 9th, 1922, with temperature here 94°, and arrived in perfect condition with temperature in Wisconsin of 60°. This package saves time and trouble for the buyer to handle. No tearing to pieces to release bees and queen, and fits in any standard single-story hive with room for combs for bees. Empties automatically and requires less than five minutes to put queen and package in hive. Sugar syrup used for feed. No danger of disease.

You may get as good bees and queens as the Hummer strain, but you will not get better, regardless of name or price. Fair, courteous treatment to all and prompt shipment after April 15 on a trunk line railway insuring fast delivery. Send for circular giving prices and details of our bees and queens.

Geo. A. Hummer & Sons, Prairie Point, Miss.

E. D. TOWNSEND wishes to announce that his summer address between the dates of June 1 and December 1 will be his old address, Northstar, Michigan, where the "Townsend Quality" extracted honey is produced, and from December 1 to June 1 to his winter home at Loreauville, La., where the "good queens" come from. Always address Northstar, Michigan, if in need of honey. For bees and queens, always address Loreauville, La. Address all complaints, if any, to my private address.

You can have cash for your wax and old combs or cappings at the market price, or we allow a little more in exchange for supplies. Write for our terms and prices.

"Falcon"

SUPPLIES ---- QUEENS ---- FOUNDATION

W. T. Falconer Mfg. Company

Falconer, New York (near Jamestown)

"Where the best beehives come from."

Ask for catalog. *Booklet, "Simplified Beekeeping for Beginners," free.*

Townsend's Bulletin No. 10

The demand is so great for the SHAW "line bred" tested and breeding queens that it will take all that I will have to spare during the fore part of the season to supply this demand, so no untested queens will be offered for May or June delivery, and it now looks as if no advertising will be necessary to sell all the untested queens we can produce during the latter part of the summer. I quote for delivery beginning May 1st, SHAW "line bred" three-banded Italian queens for breeding purposes as follows:

XXXVery sel. for breeding purposes.$10.00 ea.
XXSelect for breeding purposes.... 9.00 ea.
XVery select tested..... 3.00 ea.

Breeding queens will be mailed in large export cages. If you buy one of the two first listed queens you will get the same grade of queen that I breed from. There is none better. Remember that the SHAW strain of three-banded Italians have been "line bred" for a third of a century, from queens imported by themselves, and are an established strain of Italians.

Package Bees with Queens.

I have again made arrangements with several breeders to furnish package bees with queens for spring delivery. By buying in large quantities, on a wholesale plan, I can offer very attractive prices on the different-sized packages. There are many who would like to buy package bees, if they were sure of a square deal. My shippers will replace all dead packages at once upon receipt of a bad order report, signed by your express agent. If they fail to do this, I will see to it that you get the cost of the bees back in cash. No one could make a fairer offer and with this assurance, the most timid purchaser should not hesitate to buy. I buy all my bees of breeders who have NEVER had disease among their bees. They are shipped on a comb of sealed brood containing honey for their feed while in transit. With this package, good delivery is almost assured. Many of our packages of bees that we have shipped during the last few years have stored one hundred and fifty pounds of surplus honey. I quote for spring delivery beginning April 20th:

25 2-lb. pkgs. with untested queens for $92.50
50 2-lb. pkgs. with untested queens for 172.50
100 2-lb. pgs. with untested queens for 320.00

25 3-lb. pkgs. with untested queens for 115.00
50 3-lb. pkgs. with untested queens for 217.50
100 3-lb. pkgs. with untested queens for 410.00

25 4-lb. pkgs. with untested queens for 137.50
50 4-lb. pkgs. with untested queens for 262.50
100 4-lb. pkgs. with untested queens for 500.00

Send part payment on bees with order, balance when wanted shipped.

Address with remittance E. D. Townsend, successor to J. W. K. SHAW & CO., Loreauville, La.

Note.—The sensation of the season promised in this Bulletin will be deferred until the June number of Gleanings on account of insufficient time on my part to handle the extra work this will bring about.—E. D. T.

FARM WAGONS

High or low wheels—steel or wood—wide or narrow tires. Steel or wood wheels to fit any running gear. Wagon parts of all kinds. Write today for free catalog illustrated in colors.

ELECTRIC WHEEL CO., 23 Elm Street, Quincy, Ill.

Everything About Rhode Island Reds

Send for Remarkable Free Book

"Blue Ribbon Reds"—the latest book on the best all-purpose breed—has twelve drawings illustrating type and fourteen illustrating color. Full page picture of Rhode Island Reds in natural colors, suitable for framing. Subjects treated are:

An A-B-C Course in Judging Rhode Island Reds (in 5 lessons)—How Rhode Island Reds Originated—Mating Rhode Island Reds for Color and Shape—How to Obtain Fast Growth and Large Size in Rhode Island Reds—How to Breed up an Egg Laying Strain—How to Cull Rhode Island Reds—How to Prepare Rhode Island Reds for the Show Room—Which Is the Correct Rhode Island Red Color—Disqualifications—Standard Weights—Feed ng Poultry at All Ages—Linebreeding—How to Treat Sick Fowls—How to Get Rid of Lice and Mites—How to Build Poultry Houses and Equipment, and many others. Book given absolutely free with three-year subscription to

Rhode Island Red Journal only journal in the World devoted exclusively to Rhode Island Reds. Tells how to make big money with them—how to buy, sell, get greatest pleasure, most profit—everything you want to know about Rhode Island Reds. Published monthly. **50c year—3 yrs. $1.00.** Send dollar bill today and get book FREE.

RHODE ISLAND RED JOURNAL
533-I Democrat Bldg. Waverly, Iowa

64 BREEDS Most Profitable chickens, ducks, turkeys and geese. Choice, pure-bred northern raised. Fowls, eggs and incubators at low prices. *America's great poultry farm.* At it 31 years. Valuable 100-page book and catalog free.

R.F. NEUBERT Co., Box 884, Mankato, Minn

KITSELMAN FENCE

"I Saved 20c a Rod," says John J. McGill, Defiance, Ohio. **You, too, can save** by buying direct at Lowest Factory Prices. **WE PAY THE FREIGHT.** Write today for Free 100-page Catalog of Farm, Poultry and Lawn Fence, Gates, Posts and Barbed Wire.

KITSELMAN BROS. Dept. 21 MUNCIE, IND.

CONDON'S GIANT EVERBEARING TOMATO

"QUEEN OF THE MARKET." Big Money-Maker. Large, solid fruit; excellent canner. To introduce to you our Northern Grown Live Seeds and Plants, we will mail you 125 seeds of **Condon's Giant Everbearing Tomato** and our big 1924 Garden and Farm Guide, —— **FREE** 192-Page Book, tells how, and what to plant. Prices lower than ever.

SEND POSTAL TODAY.

CONDON BROS., Seedsmen
Rock River Valley Seed Farm
Box 90 **ROCKFORD, ILLINOIS**

This Ball Bearing

APACHE Grist Mill

PREPAID FOR ONLY

$8.00

FEED the hopper, turn the wheel, and enjoy making your own wholesome whole wheat or graham flour, old-fashioned corn meal, rye flour, chops and hominy, and *bring down living cost.* Best coffee and spice grinder. If you have poultry, grind your chicken feed, save feed money and get more eggs.

Apache grinding plates of special mixture iron made to give longest wear. Steel ball bearings make it only a boy's job to run it. Send money or check today. Satisfaction guaranteed. For the present we can make prompt delivery. So don't delay.

A. H. PATCH, Inc., Clarksville, Tenn.

The Apache Grist Mill is companion to the Black Hawk Corn Sheller, famous for 35 years for its "Can't Wear Out" Guarantee.

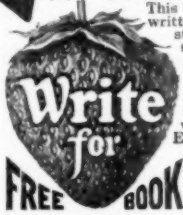
KELLOGG'S "Thorobred" STRAWBERRY PLANTS

GIVE BIG CROPS and BIG PROFITS

No matter whether you grow Strawberries for home use or for market—Kellogg "Thorobred" Plants grown the "Kellogg Way" will produce more berries and make more money for you than anything else you can grow.

Many Kellogg growers are making from $500 to $1200 cash profit per acre, while others report a yield of 200 to 300 quarts from their back-yard Kellogg gardens—and we can prove it.

(11) **Our FREE BOOK Tells How**



This wonderful strawberry book is written by the world's greatest strawberry expert. Gives his secrets for growing the big crops of fancy berries that won him fame and fortune. Tells how you can have strawberries both summer and fall. Pictures and describes 20 of the world's greatest Standard and Everbearing varieties. Write for your copy NOW. It's FREE!

R. M. KELLOGG CO.
Box 2611
Three Rivers, Mich.

850,000 GRAPE-VINES

66 varieties. Also Small Fruits, Trees, etc. Best rooted stock. Genuine. Cheap. 2 sample vines mailed for 20c. Descriptive catalog free. West Hill Nurseries, Inc., Box C, Fredonia, N.Y.

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All For One Year

Woman's World,	(Monthly)	Our Price
Good Stories,	(Monthly)	$1.00
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The Household,	(Monthly)	ALL FIVE
The Farm Journal,	(Monthly)	FOR 1 YEAR

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World's Best Roofing at Factory Prices

"Reo" Cluster Metal Shingles, V-Crimp, Corrugated, Standing Seam, Painted or Galvanized Roofings, Sidings, Wallboard, Paints, etc., direct to you at Rock-Bottom Factory Prices. Save money—get better quality and lasting satisfaction.

Edwards "Reo" Metal Shingles

have great durability—many customers report 15 and 20 years' service. Guaranteed fire and lightning proof.

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Get our wonderfully low prices and free samples. We sell direct to you and save you all in-between dealer's profits. Ask for Book No. 183

LOW PRICED GARAGES

Lowest prices on Ready-Made Fire-Proof Steel Garages. Set up any place. Send postal for Garage Book, showing styles.

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THE HOME OF THE HONEY-BEE

4% BANKING BY MAIL

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of the Savings Deposit Bank Company is the fact that Savings draw interest from the 1st of the month if deposits are made on or before the 5th.

Wherever you live you can deposit in this bank as it welcomes deposits BY MAIL.

THE SAVINGS DEPOSIT BANK CO. MEDINA OHIO

A. T. SPITZER PRES. E. R. ROOT VICE PRES. E. B. SPITZER CASHIER

Mayeux's Three-Banded Queens and Bees Stand for Themselves

We have been breeding the same line of Three-banded for over 14 years. The large, thrifty kind. When you purchase a package from us you get the actual weight of bees and a nice frame of brood and honey, the natural food for bees in transit. Queens, if wanted, are introduced laying en route, a great advantage to the purchaser.

Note our prices are very reasonable; so order now to get an early delivery. Will start shipping April 29.

1	2-lb. on comb in a large roomy pkg.	$3.15
10	2-lb.	30.00
25	2-lb.	71.25
50	2-lb.	137.70
100	2-lb.	255.00

Additional pound of bees or frame of brood, 75c each. 2-frame nuclei, same as 2-lb. packages.

Prices on Queens.

1	Queen, Untested Three-banded, only.	$ 1.00
10		9.50
25		23.75
50		47.50
100		90.00

We have only enough queens for the above packages. We guarantee freedom of disease and safe delivery.

The Home of Good Queens.
OSCAR MAYEUX, HAMBURG, LOUISIANA.

Achord's Bees and Queens for 1924

ORDER NOW FOR APRIL AND MAY DELIVERY AND RESERVE YOUR SHIPPING DATE.

Prices April 15 to May 15th, Express Collect.

2-lb. package with select untested queen.	$ 4.50
Five 2-lb. pkgs., select untested queens.	21.25
Twenty-five 2-lb. pkgs., sel. unt queens.	100.00
3-lb. pkg. with select untested queen...	$ 5.50
Five 3-lb. pkgs., sel. untest. queens....	26.25
Twenty-five 3-lb. pkgs., sel. unt. queens.	125.00

QUEENS.

Select untested, $1.25 each; ten, $11.50; twenty-five, $25.00. Select tested queens, $2.00 each.

TERMS: 20 per cent with order to secure reserved shipping date. Balance just before shipment. Safe arrival guaranteed. No bee disease in this district. Inspection certificate with every shipment.

We have two of the largest, best equipped queen-rearing apiaries in the South, also a series of outyards of fine honey-producing three-banded Italian bees which we run exclusively for package bees. We can give you the very best in bees, queens and service.

W. D. Achord, Fitzpatrick, Ala.

1924 Nuclei With One Extra Pound Bees *1924*

We are now booking orders for 1924 delivery. After several years' experience in shipping different sizes of nuclei and pound packages to nearly all parts of U. S. and Canada we have found the regular three-frame size with one extra pound of bees to be the correct size to insure the purchaser a surplus crop of honey, provided the bees are received before May 15.

Over 1500 colonies will be operated for the sale of nuclei. Booking capacity 2000 nuclei. For those who have become disappointed in results obtained from buying bees in package form, I would like to urge the purchase of some of our large three-frame nuclei with the extra pound of bees. Safe arrival and satisfaction guaranteed. Bees are absolutely free from contagious diseases. Bees will be shipped on combs built from full sheets of foundation nearly all brood capped. Send for circular telling more about our nuclei. Terms, 20 per cent with order, to guarantee acceptance. Balance before shipment.

3-FRAME NUCLEI OF ITALIAN BEES WITH QUEENS	**$5.00 EACH**
25 LOTS OR MORE	**4.75 EACH**
50 LOTS	**4.50 EACH**
100 LOTS	**4.25 EACH**
QUEENS, UNTESTED, $1.00 EACH, OR	**10.00 DOZ.**

Write for prices for carload lots of full colonies in ten-frame hives, delivered.

"The bees arrived yesterday and they were the finest lot of bees I ever looked at. Not one comb broken."—Dr. Chas. S. Chadwick, Jackson, Mich.

"I am more than pleased with the 50 nuclei you sent me last year. Book my order for 50 more."—Robt. Hunter, St. Etienne de Beaucharnois, Quebec, Canada.

"I am much pleased with your stock and have recommended your bees to a number of beekeepers."—Otto W. Gall, Inspector of Apiaries, Binghamton, N. Y.

"Some of the nuclei you sent me have made 80 pounds surplus already."—Maurice Geary, Ironwood, Mich.

"The bees I received June 1st have made me nearly one super of surplus. The above speaks well for the extra bees."—Omar C. Curtis, Escanaba Nat'l Bank, Escanaba, Mich.

ROOT QUALITY BEE SUPPLIES.

A. R. IRISH, Box 134, Savannah, Ga.

Make Your Own Brooder

Putnam Brooder Heater
$4.75 postpaid

Total Cost, including Brooder Heater, $4.96

"I have 200 little chicks which we raised with the Putnam Home-made Brooder, and they seem to be doing fine. I have not lost one yet," writes Mrs. C. W. Bennett, Fulton, N. Y.

You can make a better brooder than you can buy. A 14-year old boy can do it in an hour with a saw and hammer. Your brooder complete with Putnam Brooder Heater need not cost you more than $4.96.

This home-made brooder will care for from 25 to 60 chicks. You can make as many brooders as your plant demands. Naturally chicks do better in small flocks.

How to Order:—I sell the Putnam Brooder Heater only. The other materials you can secure at your dealer for less than 25c. The price of my Brooder Heater is $4.75. With every Brooder Heater I send easy-to-follow directions for making the Home-made Brooder. Your dealer should have the Putnam Brooder Heater in stock. Ask him for it. If he doesn't have it, send me $4.75, check or money order; I will ship you at once, postpaid. In ordering, please state your dealer's name.

GUARANTEE:—I guarantee the Putnam Brooder Heater to give satisfaction or it may be returned in good order within thirty days, and the money paid for it will be refunded.

I. PUTNAM, Route 260-B Elmira, New York

ANNOUNCEMENT

W. H. Laws has moved his queen-rearing headquarters from Beeville to Wharton, Texas, and wishes his patrons to know that he has a better locality in which to produce queens, and that the supply and quality will be as good as ever produced.

Remember that LAWS' TALKING QUEENS speak for themselves, and their language is music to the ear of the honey producer.

Light three-band Italians only.

Prices right. Circular on application.

W. H. LAWS

BOX 425, WHARTON, TEXAS.

Superior Italian Bees & Queens

One customer reports 43 colonies purchased from us produced 20000 lbs.

Full colonies, no cover or bottom, in car lots.....$7.00 each
2-pound packages with queens.. $4.50 each; 10 or more, $4.00 each
Two-frame nuclei.....Same price
3-frame nuclei with queen, $5.50 each; 10 or more.....$5.00 each

Cypress Bee Supplies

Standard 10-fr. dovetailed hive bodies, $70 per 100.

White pine Hoffman frames, $45.00 per 1000. Shallow extracting, $32.00 per 1000. Shallow extracting supers with frames, $70.00 per 100. Give-away price on eight-frame bottoms and covers, as good as can be had, for $40.00 per 100, on either.

Let us quote you on what you need; we can save you money.

The Stover Apiaries

Mayhew, Miss.

Knight Pays the Transportation Charges on Package Bees

An item not to be ignored. Shipments via parcel post. They go through quicker.

100 nuclei, sent a party in Michigan last spring, averaged 263 pounds surplus honey. More than 400 per cent profit. Will give you his name and address upon request. Nothing but high-quality queens, breeders being selected for years from high honey-gathering colonies, can produce such high averages. No one, expecting to receive it, would give a dime for a poor queen.

PRICES TO JUNE 1.

1-pound package, including select untested queen	$3.25
2-pound package, including select untested queen	5.25
3-pound package, including select untested queen	6.25
10 or more packages, either size	25c per package less

THREE-BANDED LEATHER-COLORED ITALIAN QUEENS.

1 select (one grade) untested queen	$ 1.25
5 select (one grade) untested queens	5.50
10 select (one grade) untested queens	10.00
Select tested queens, each	2.00

Safe arrival of bees and queens, pure mating and perfect satisfaction guaranteed. Furthermore, I make good my guarantee. 10 per cent cash books your order. Will ship on the day you name, having the bees, men and equipment to handle all orders promptly. Should you find a queenless colony this spring send to me for a queen to save them. I will not disappoint you. No disease.

JASPER KNIGHT, HAYNEVILLE, ALABAMA.

The Thrifty Kind

will increase profits for you in 1924.

1924 brings us to our thirty-second year as commercial queen-breeders. For more than a quarter of a century we have been breeding up the quality of **THRIFTINESS** in Forehand's Three-Bands. When you buy our bees and queens you buy the profits of our many years' experience.

Place your order now for spring delivery. Only 10 per cent deposit required with order. Our usual guarantee on all bees and queens.

Parcel post and express shipments of package bees will be made from our apiaries during the season of 1924.

POUND BEES: Write us your requirements and we will quote you very attractive prices.

QUEENS: Untested, 1 to 11, $1.00 each; 12 to 25, 85c each; 25 to 50, 80c each. Select Untested, 1 to 11, $1.25 each; 12 to 25, $1.00 each; 25 to 50, 90c each. If interested we will gladly quote you our prices on large quantities.

For full information write for a copy of our latest booklet, "How to Increase Profits in 1924."

W. J. FOREHAND & SONS, Fort Deposit, Ala.

CHICAGO FOR QUALITY FOR SERVICE CHICAGO

When you get **ROOT QUALITY BEE SUPPLIES** from the greatest shipping center in America you get **SATISFACTION.** You get a superior grade of goods in **QUALITY** and **WORKMANSHIP.** Trains leave Chicago daily with connection for your station. Write for our new 1924 catalog. Let us quote you on your wants.

A. I. ROOT CO. OF CHICAGO

224-230 West Huron Street. *Chicago, Illinois*

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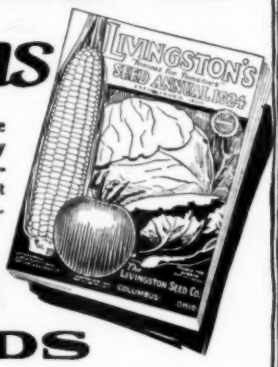

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